OVER 300 MACINTOSH PRODUCT REVIEWS!

October 1988

MacUser

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The Business of Creativity

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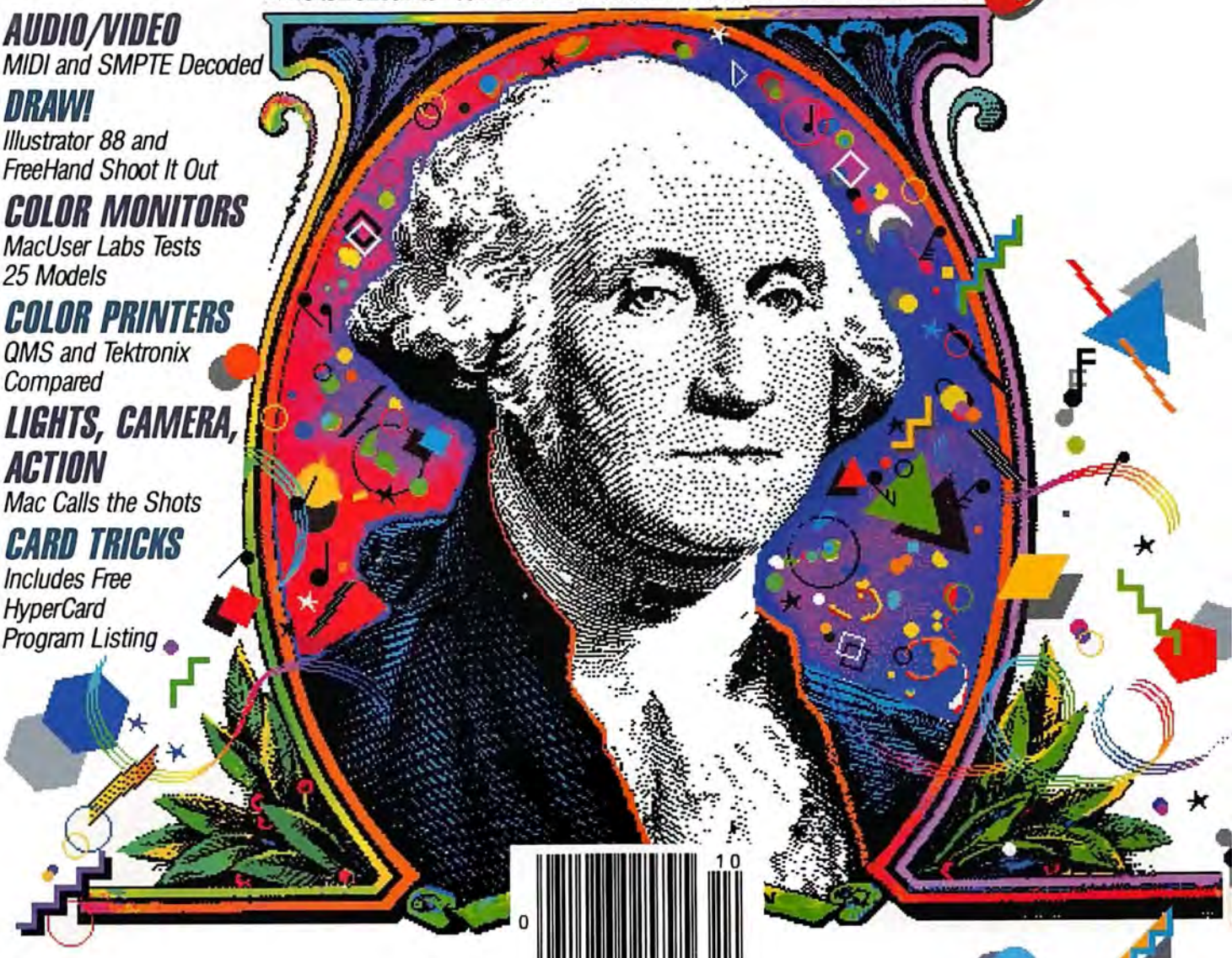
DRAW!
Illustrator 88 and FreeHand Shoot It Out

COLOR MONITORS
MacUser Labs Tests 25 Models

COLOR PRINTERS
QMS and Tektronix Compared

LIGHTS, CAMERA, ACTION
Mac Calls the Shots

CARD TRICKS
Includes Free HyperCard Program Listing



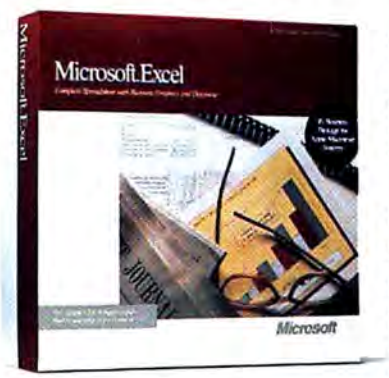
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Introducing Microso

It's been said that outdoing the competition is relatively easy. Outdoing yourself is the hard part.

We couldn't agree more.

Case in point: Microsoft® Excel. We took the most powerful, most popular spreadsheet program in today's Macintosh® market and made it history. Enter Microsoft Excel version 1.5.



It lets you customize your own menus and dialog boxes. Which is perfect for an environment with one-of-a-kind needs. Namely, your office.

And since customization is now easier for the independent software developer, you'll be seeing a lot more applications that use Microsoft Excel to give you specific solutions for your specific needs.

Microsoft Excel 1.5 also gives you full color support for the Mac® II. Which makes your daily spreadsheets look more like annual reports.

We've even built Microsoft Excel 1.5 to take advantage of MultiFinder,™ the program that lets your Mac do more than one thing at a time. In other words, you can have Microsoft Excel number crunching in the background while you're word processing in the foreground.

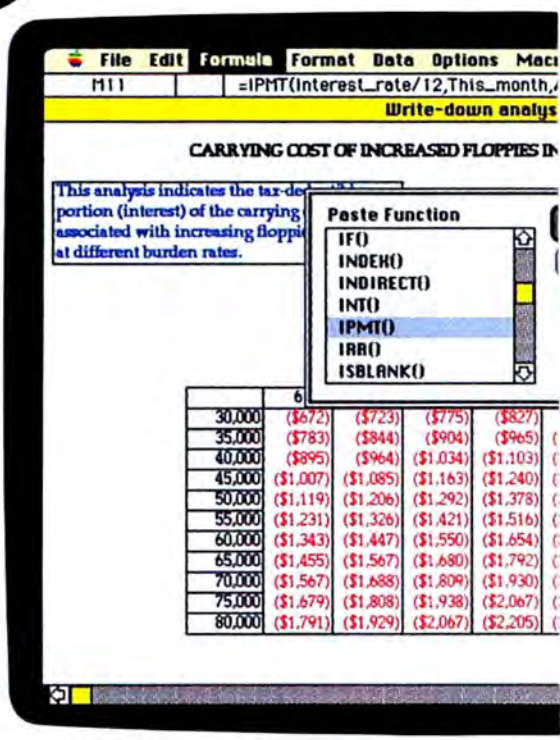
And if Microsoft Excel wasn't simple and powerful enough, we've added simpler tools for developing charts and 44 powerful new worksheet functions. All of which means that you do less work.

Of course, we're going to need a lot more room and you're going to need a lot more time to go over everything Microsoft Excel 1.5 has to offer. So we suggest you call (800) 541-1261, Dept. I37 for a copy of the Microsoft Excel 1.5 brochure and the name of your nearest Microsoft dealer.

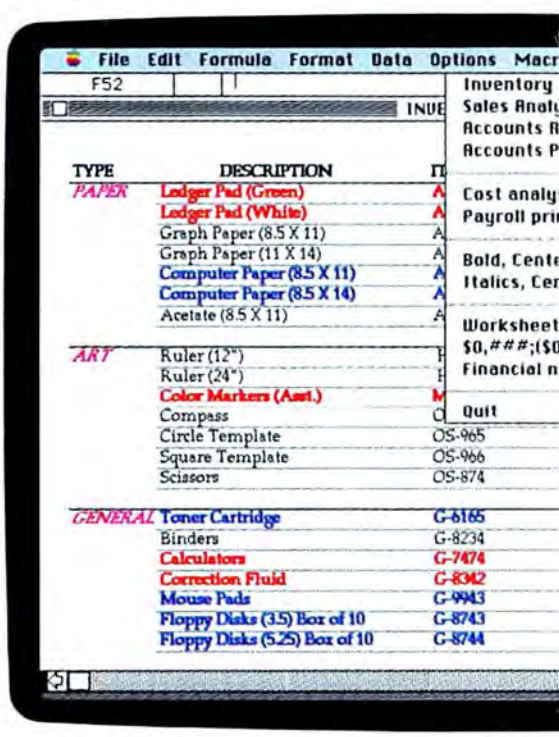
Over eighty-percent of all spreadsheets in use on the Macintosh are Microsoft Excel. And with all the enhancements of Microsoft Excel 1.5, we're bound to exceed that.

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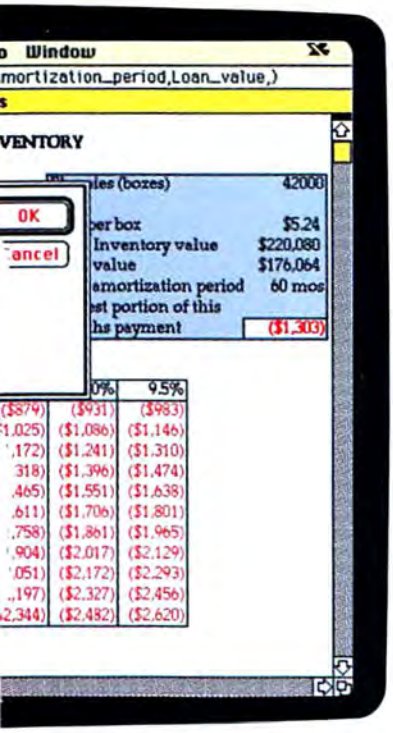


With our 44 new worksheet functions, you'll be able to build to develop a broad range of analysis. They run the gamut fro

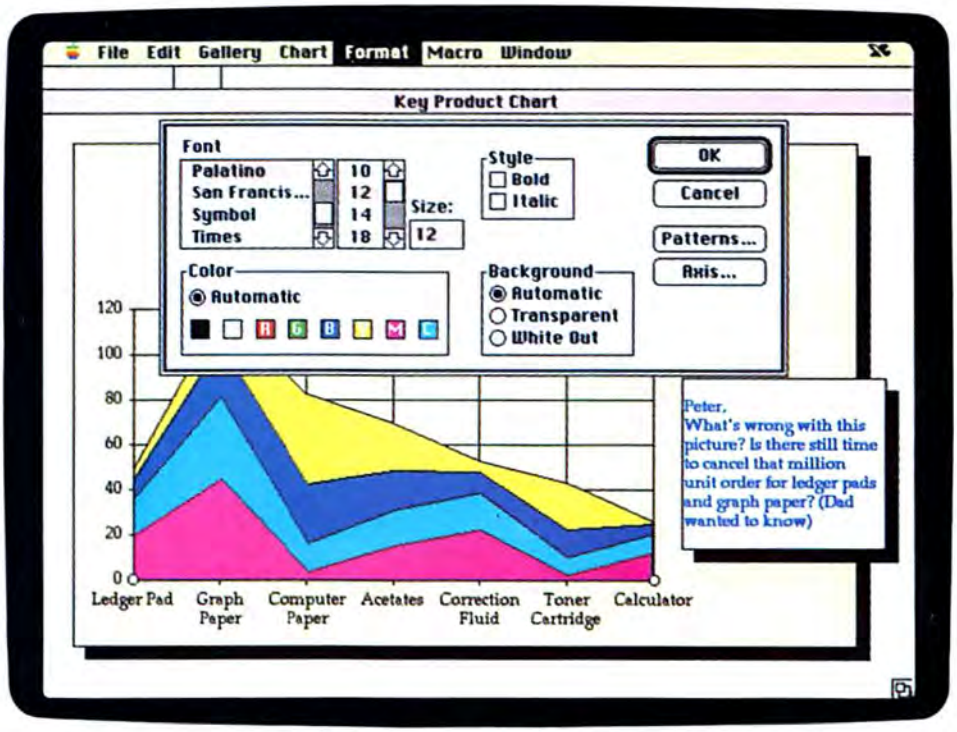


Customizable menus enable you to go straight to the object the menu bar to list new menu headings. Or just add a singl formats, commands or other macros can be accessed quickly

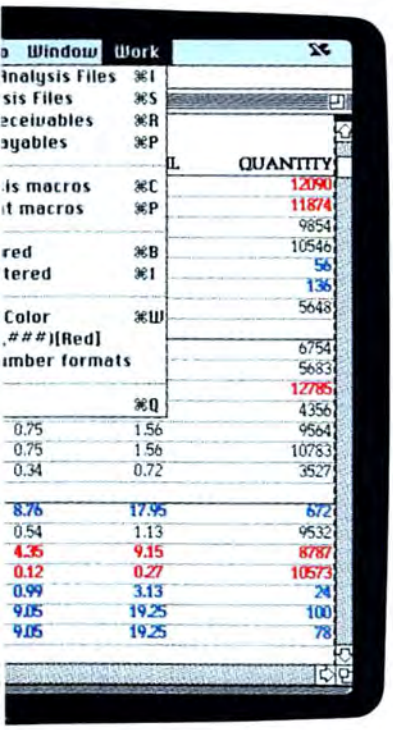
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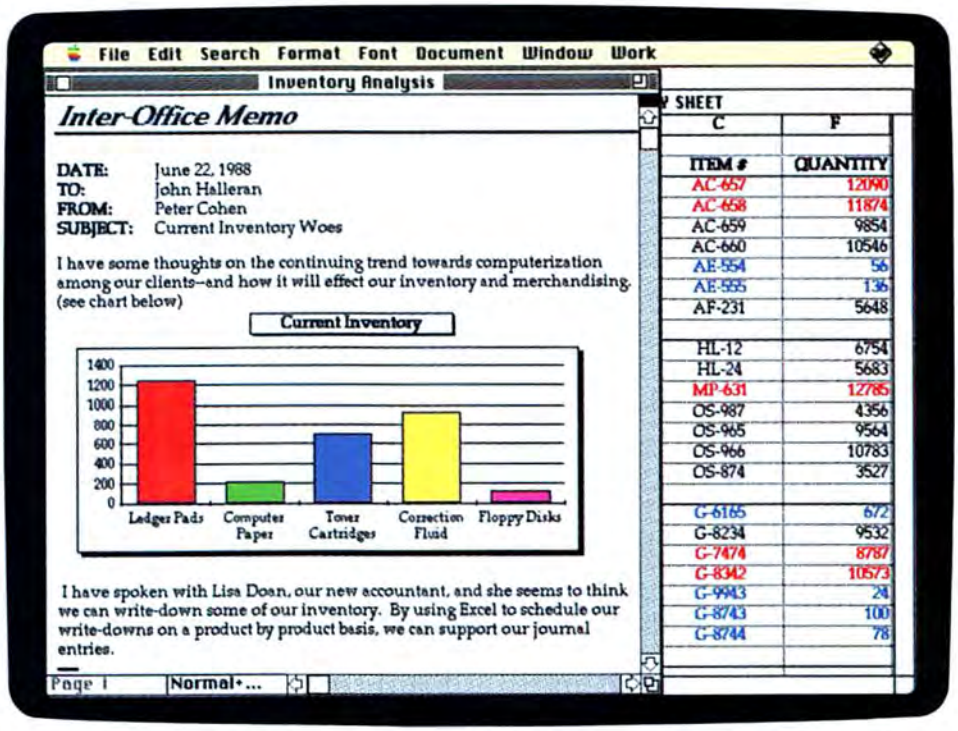
nore powerful formulas that can be used n matrix math to depreciation functions.



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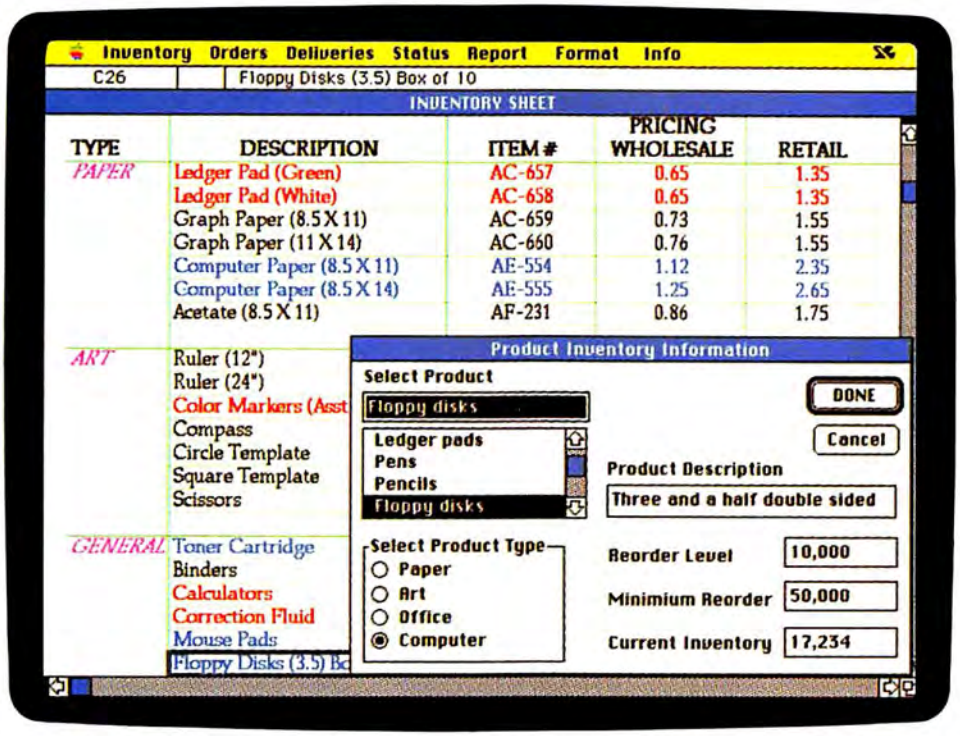


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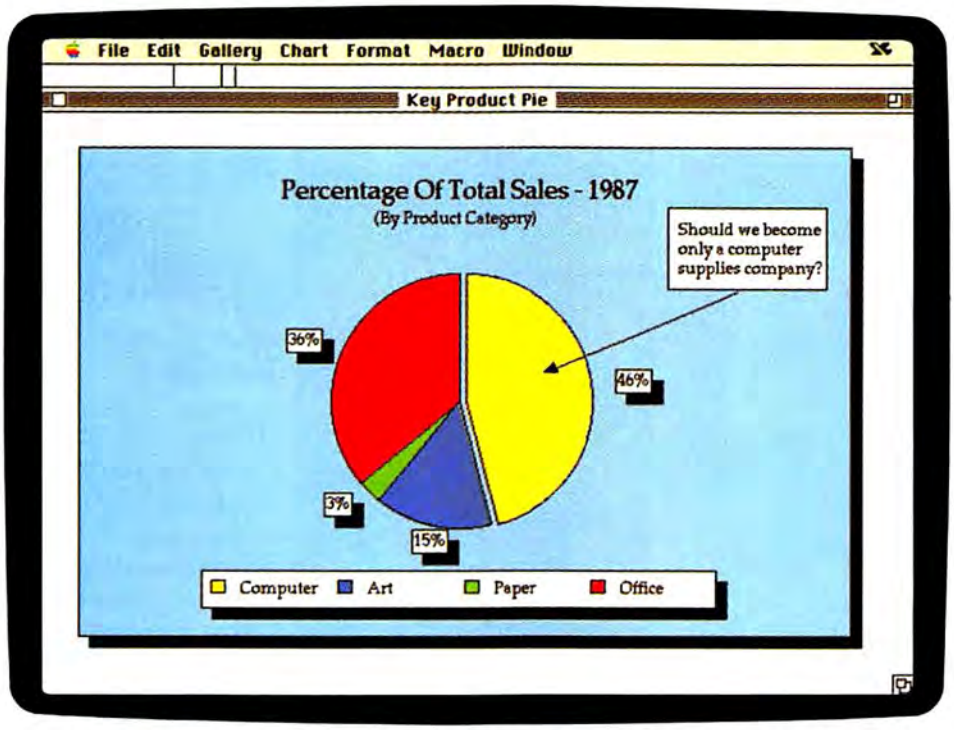


If you have a multitude of things to do, Microsoft Excel 1.5 is the program for you. Under MultiFinder, it will continue calculating and executing macros even when you move on to other applications such as Microsoft Word or Microsoft PowerPoint.™

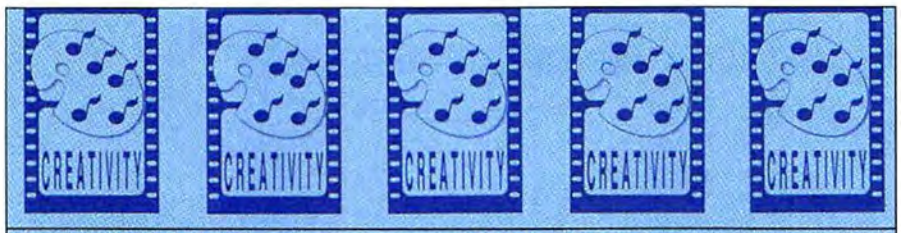
Sooner or later
someone
was bound to
exceed
Microsoft Excel.



Microsoft Excel can be customized to meet your particular business needs. You can completely customize the program with new menus and dialog boxes to prompt users unfamiliar with the program.



Your output will command attention when it's enriched with color, shadows, fonts or fill patterns. And floating text can be inserted to emphasize or clarify particular points.



Interactive Cultures
by Jon Zilber

Macintosh, Macintosh, wherefore art thou? Developments in Mac software and hardware have brought the Mac into music, art, and film studios. This survey of the Mac's role in the arts shows you how. **100**



The Producers
by Russell Ito

Wanna make a picture? Well, you'll need a script-writing program that combines presentation and word processing. And how about budgeting? You'll need a program that'll help you manage millions of dollars. How about editing? How about reading this article to find out? **128**

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Is it music or is it magic? You make the call as the Mac plays a big role in digital sound sampling. **148**

The Write Staff
by Paul Lehrman

Prehistoric forms of music notation involved metal plates and a chisel. Now, thanks to such programs as HB Music Engraver and Graphic Notes, you can use just a simple keystroke. **164**

Call It a Draw
by Diane Burns and S. Venit

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We've achieved color on-screen with the Mac II. Big deal. What kind of output will you get? Try it on a QMS ColorScript 100 or Tektronix 4693D and see. **182**

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MacUser LABS

MACUSER LABS

True Colors
by Aileen Abernathy and the MacUser Labs Staff

OK, we got a little excited over the Mac II and its ability to create 16.8 million (count 'em) colors — 25 monitors' worth, anyway. You'll see that there are big screens, little screens, even ones with missing dots as MacUser Labs tests such monitors as E-Machines, RasterOps, and SuperMac 19 to see who counts the colors best. **236**

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TECHNICAL DIFFICULTIES AND HELP
Although we can't offer you any telephone assistance, *MacUser* welcomes your technical questions. If you've got a Mac question or problem, send it to Chris Espinosa, The Help Folder, c/o *MacUser* Magazine, 950 Tower Lane, 18th floor, Foster City, CA 94404. Chris works for Apple (in fact, he's been there longer than anyone), and if he can't give you an answer himself, he'll find someone who can. Because of the volume of mail we receive, we can't answer all of your questions so we also recommend that you take advantage of your local user groups. They're often an excellent source of information, and you can find the one nearest you by calling Apple toll-free at: (800) 538-9696, ext. 500.

TIPS, HINTS, AND PROGRAMS
We love to get tips and hints (on disk, please) from our readers. Any tips should be sent to The Tip Sheet, c/o *MacUser* Magazine, 950 Tower Lane, 18th floor, Foster City, CA 94404. We can't print every tip, but we try our best to pick the most interesting and representative ones for publication. We're also interested in hearing from any programmers who are interested in contributing to our utilities disk series or labs benchmark disk series. If interested contact Chip Carman, Technical Director, at the same address.

WRITING FOR MACUSER
If you have an idea for an article you'd like to write, we'd like to read it. Send a query letter with samples of your writing (published if possible) and some information about your background to Louise Kohl, Executive Editor, *MacUser* Magazine, 950 Tower Lane, 18th floor, Foster City, CA 94404. No calls please. Since we rarely buy unsolicited manuscripts, save yourself some work, and don't send us a completed article without writing first. Please allow 4-6 weeks for a reply.

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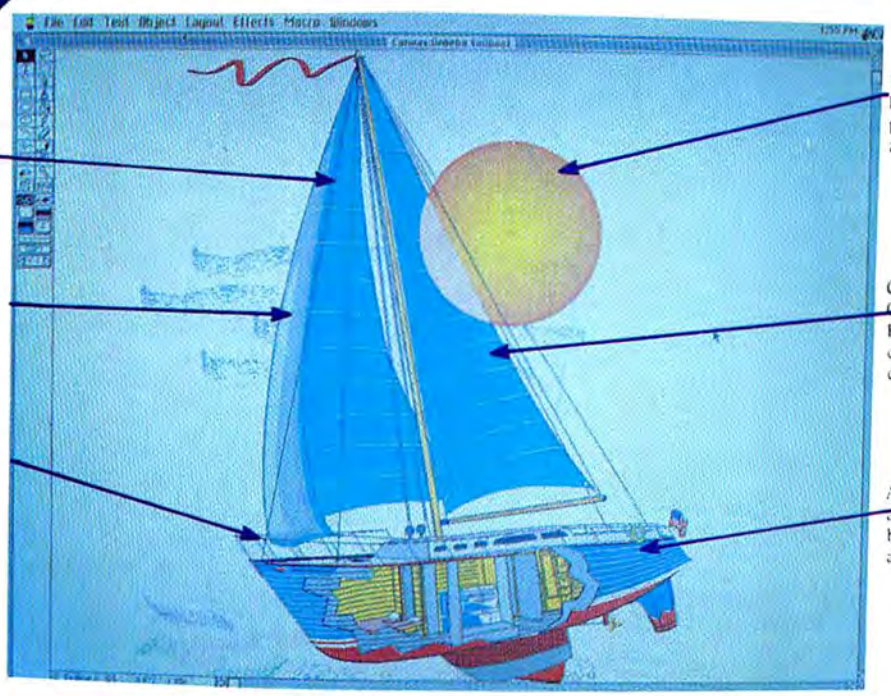
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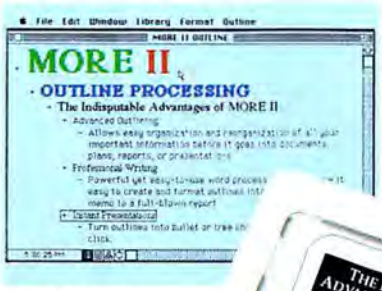


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The Business of Creativity

Computers have been hailed as the best thing to happen to business productivity since the industrial revolution and the best thing to happen to scientific research since the microscope. Even in the early days of computing, however, the incredible creative drive of the human spirit compelled some adventurous people to explore the creative potentials of computer technology. The early explorers of creative computing were not content to accept that computers, the pinnacle of human technology, didn't have implications in the creative arts that might be as far reaching and profound as the impact computers were already having in the worlds of science and business.

What started as university students and faculty experimenting with computer games, graphics, and music has now matured into an important new computer market that offers a wide array of sophisticated applications for graphic arts, design, music, video, drama, dance, and other creative endeavors. This emerging market serves the technology needs of many creative-arts professionals. And it's no surprise to Mac aficionados that the computer at the forefront of this new alliance of art and technology is the Macintosh. This month's special report on the business of creativity focuses on the two largest groups of artists using the Mac — musicians and visual artists.

THE AVANT-GARDE COMPUTER

Big Blue may dominate the business market, but the Macintosh has become the computer of choice among people who are in the business of creativity. The Macintosh (unlike comparable IBM systems) provides good built-in graphics and sound in every machine, which prompted early Mac software developers to create some decent graphics and music programs.



Early programs were limited in power, but they both introduced innovative concepts that captured the imagination of artists and musicians and appealed to the musical and artistic sense within everyone.

The early creativity applications on the Mac helped break the traditional "chicken versus egg" deadlock. Early awareness of creativity software on the Mac meant that not only did quite a few software developers produce more and better software for graphic arts and music but that there was also a healthy market of professional artists and musicians aware of the software that was being developed. And even though some software designed originally for the Mac has trickled down to the less advanced world of MS-DOS, the Mac is still the primary source of today's most creative and innovative personal-computer software.

SUCCESS STORIES

The Macintosh's success in desktop publishing has led to a well-developed graphic-arts market for the Macintosh. The Macintosh now plays a major role in the creation of illustrations for magazines, newspapers, books, advertisements, and packaging of consumer products. Everything from *USA Today*'s graphics to the design of the Certs mints package are showcasing the Mac's revolutionary impact on graphic arts.

The advent of the Macintosh II, with its color-graphics capabilities, has opened many more doors for the Macintosh because it can now be used for applications that require color. Places that never thought twice about the black-and-white, compact Mac models now sing the praises of the Mac II with all the zeal of the newly converted. The Mac II's color-graphics capabilities have propelled sales of the machine to many businesses that are discovering the Mac II is a more powerful tool than an MS-DOS machine for enhancing and facilitating graphic arts and are ultimately leading to more effective graphic communications. Companies are eager to tap the power of the Mac II to make color publications, presentations, and sales materials because it offers a tremendous savings over the normal four-color separation process used in traditional printing and graphic arts. Color desktop publishing on the Mac II means that good looks just got less expensive.

I WANT MY DESKTOP MTV!

The Mac II is leading the way in another new technology — desktop video. This exciting emerging technology is the combination of many application areas that are already established on the Mac, such as graphic arts, video production, animation, music, and sound effects. The Mac II, in combination with special video add-in boards, can be used to mix computer graphics, sound, and live (or taped) video.

Desktop video is a very significant development, not only for TV stations and video-production facilities but for other businesses as well. The Mac II is getting ready to take desktop presentations to a new level; instead of showing easy-to-read transparencies or a nice slide show, you'll be able really to get people's attention with a multimedia video presentation and leave behind a videotape of the presentation too. Right now the software and hardware is still in the formative stages, and the results you get with today's products are good but not great — a bit crude compared to what you're used to seeing on TV.

Within six months to a year, however, you can expect to see Macintosh II software and hardware for video that will be up to the level of today's professional video systems costing more than $100,000. The desktop publishing price/performance breakthrough strikes again!

> The early creativity applications on the Mac helped break the traditional 'chicken versus egg' deadlock.

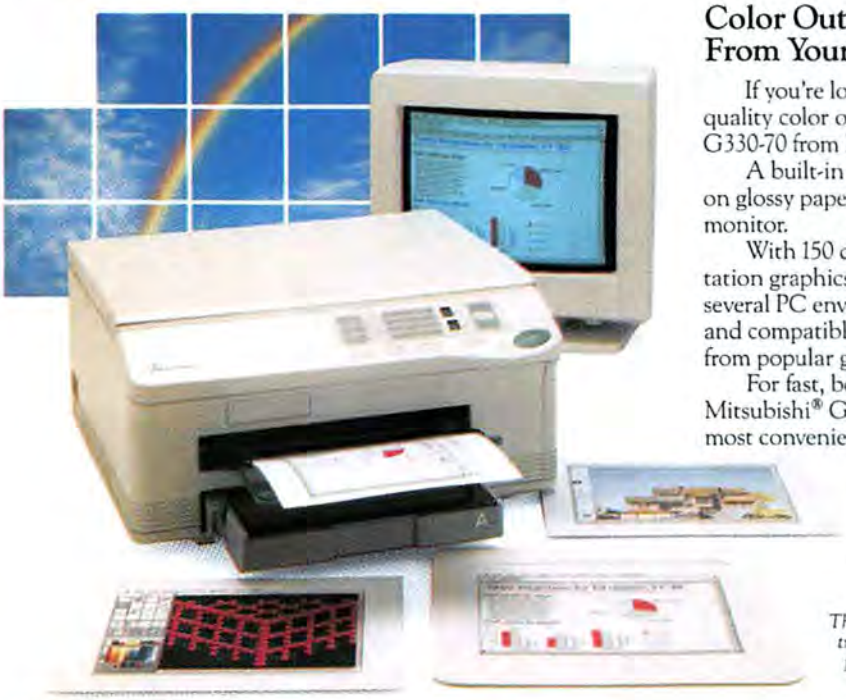
THIS MONTH'S MENU

In this month's issue, we've placed several items on the menu that are related to our theme of creativity. To start, we explore the world of color: We have a comprehensive report from MacUser Labs that compares 25 color monitors for the Macintosh. Next, we have a comparison of the only two color laser printers available: the Tektronix 4693D Color Printer and the QMS ColorScript 100 (which each take a different approach to color printing). To round out our colorful stuff, we have a comparative review of Illustrator 88 and FreeHand, two excellent drawing programs that are doing a lot to make people hungry for color monitors and color laser printers.

For the professional-music crowd, we have an ensemble of pieces reviewing the latest in notation and transcription software as well as programs designed to help you get the most from your expensive music gear, including sound-shaping programs for digital sound samplers; editors and librarians for synthesizers; and a slew of HyperCard stacks for pros, amateurs, and fans.

Also, just for this month's issue, we're doing something a bit different. There's a misconception that it takes a huge studio full of expensive hardware

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SIGMA DESIGNS

to produce state-of-the-art art. It's not true. Good old MacPaint 1.0 on a 128K Mac is still a powerful artist's tool that even da Vinci would have loved. Today's Mac MIDI musicians, with a sequencer, a synthesizer, and a budget four-track recorder, have more technology at their disposal than Bach, Beethoven, or The Beatles ever had. There are a host of tools for wordsmiths of all types — from specialized word-processing programs for screenwriters to simulation packages that science-fiction writers can use as brave new world processors. A single animator can produce a minimovie that only a few years ago would have taken teams of animators and specialized equipment. And it costs a lot less than the quarter of a million dollars per minute that *Who Framed Roger Rabbit?* ran.

We felt the best way to make this point would be to show you some top-notch Mac artists at work, focusing on how they leverage their talent with simple tools and a few tricks of the trade. You might not know their names, but you'll probably recognize their work. And you'll notice, in these "Portraits of the Artists," that they don't all have million-dollar production facilities or every software package ever written. They make the most they can of the resources available to them, often doing their preliminary work on a fairly modest home system and using a service bureau or professional production facility — such as a Linotronic print shop for art or a 24-track recording studio for music — for the final output.

Good old MacPaint 1.0 on a 128K Mac is still a powerful artist's tool that even da Vinci would have loved.

THE POWER TO CREATE

Some of the toys in these production departments and service bureaus are truly astonishing. Accurately representing and manipulating images and sound on a computer is a technically complex business, and graphics and music applications are among the most sophisticated and powerful programs on the Macintosh. (Many creativity products for the Mac are so technically demanding that they cannot be implemented successfully in the world of MS-DOS.)

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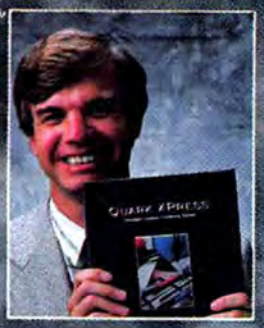
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ject, you'll want to start with a large color display and lots of RAM. And you'll want some special peripherals such as graphics tablets, scanners, and printers. If you need color scanners or color printers, you'd better brace yourself for some serious spending. And let's not forget to mention mass storage. A single 8½-x-11-inch page scanned at 300 dots per inch in 8-bit color or gray scale can take up to 7 megabytes of storage space when saved as a bit-mapped document. Even 100 megabytes of storage space soon starts to look pretty cramped.

Musicians also have demanding mass-storage and RAM requirements, especially if they are working with digitized sound (such as the CD and DAT). The Mac II has the processing power and most of the software to create and master a compact disc completely, but you'll need up to 50 megabytes of RAM to hold large sound samples and about 600 megabytes of hard-disk space for the final data that comprises the CD. These systems are expensive in Mac terms — New England Digital's Synclavier synthesizer and Direct-to-Disk recording system, at well over $100,000, may be the most expensive Mac peripheral there is — but they're bargains compared to the cost of studio time and tape mastering that is required to produce an all-digital audio CD.

Graphics and music applications are among the most sophisticated and powerful programs on the Macintosh.

Whether you're an after-hours artist working in a basement studio or a professional with a state-of-the-art facility, there are a few more things you'll need: ideas, inspiration, and ingenuity. And, maybe more than anything else, that's where the artist's Mac shines most. A big part of the Mac's appeal to artists is the creative design of the machine itself, from the sleek, compact, user-friendly, household-appliance look of the original Macs to the artistically designed, graphic user interface. Even the name Macintosh showed a flair for creativity and originality — a flair that both attracts and inspires creative users.

FRED

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Letters

The woodcut portraits of the columnists ain't coming back, so stop asking. We welcome your views on any other issues of interest to the Macintosh community. Send your comments to Letters to the Editor, MacUser, *950 Tower Lane, 18th floor, Foster City, CA 94404. All letters become the property of* MacUser, *and we reserve the right to edit any letters we print.*

NONPLUSSED

All the talk about the need for a low-cost, entry-level Mac ignores the obvious: the "new" Mac Plus. Now that Apple has lowered its prices, it's not hard to get a Plus for a street price of around $1,250. While not exactly rock-bottom, it's certainly affordable and more competitive with MS-DOS setups than it used to be.

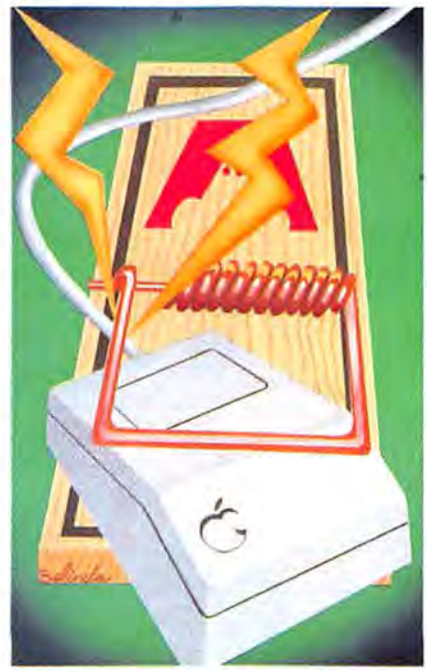
I work with SEs all day at work and thought I wouldn't be able to afford a home system for another year or two. Perhaps the soothsayers are right when they predict that Apple is getting ready to cut the Plus loose, but I would be interested in seeing their sales figures for the past few months.

JIMMY DURCHSALG
REDWAY, CA

LET FREEDOM RING

Twenty bucks certainly isn't too much to pay for a program you're going to use, as suggested in Neil Shapiro's June '88 column on "Paying for What You Get." But on the two-page spread in front of the column, there's an ad for a $1,000 music program. Come *on,* no wonder we cadge programs from each other, from bulletin boards, from owners who sell us their computers. The prices people are asking are simply outrageous!

In the age of the Information Explosion, there can be no explosion if the suppliers of the information are splitting hairs about who owes what to whom. The information and the means of transmitting it — the computer program — must be *free.* That's right, pal, free to everyone who can develop the mental wherewithal to use them, just like in the public library. Computer programs are a medium, like pencils. Hardware manufacturers should buy the programs from software developers and distribute them free with their machines, as incentives to buy. But the idea of someone charging $1,000 for a couple of disks just because the applications on them can push information around in a particular way is ridiculous.



BELINDA MORRISSEY

Long live free information.

ANONYMOUS
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Libraries are great places to borrow books, but if you want to keep one, you still have to go to a bookstore. (And you pay for the library books with your taxes, anyway.) But you may be on to the NeXT trend in software distribution: Steve Jobs plans to distribute at least two third-party programs — Mathematica and WriteNow — with his long-anticipated machine. — AA

HYPERFORMANCE

What is the likelihood that there will be a compiled version of HyperTalk and/or an interpreted version with bug-chasing facilities similar to those that come with Lightspeed programs? I'm an amateur programmer — not even a hacker — who's been impressed with HyperTalk as a tool for developing some programs for offbeat data analysis and report-writing tasks at work, and for keeping track of some family matters at home.

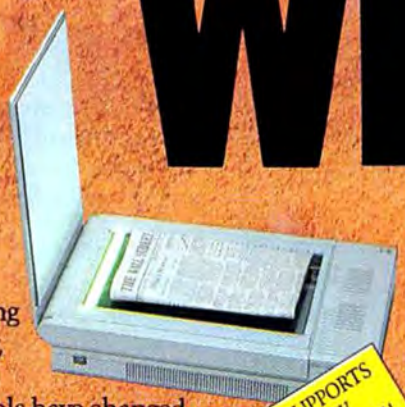
But HyperTalk is so *slow.* Especially when you want to do multiple processing steps to data on the screen. Ca-chunk, ca-chunk. You can practically see the wheels spinning as it reads data from a field, manipulates it, and stuffs it back. Sure, you could use HyperTalk as a development tool and then manually translate the code into a compiled language. But that's asking a lot of an amateur working on limited-use personal programs. Why not a simple way to compile the HyperTalk stack once the bugs have been worked out? And speaking of debugging, I really miss the ability to flag a stopping point and then step through the code, monitoring variable values as you go. I doubt that HyperTalk can really be a programming tool "for the rest of us" until it provides more debugging help.

RODGERS ADAMS
MINNEAPOLIS, MN

HyperTalk, like all interpreted languages, is slow to execute. Building a source-level debugger for an interpreted language is much simpler than doing the same for a compiled language, so I'll second your motion for a friendlier HyperTalk debugging environment. Michael Swaine's column

WHATEVER WE HAVE

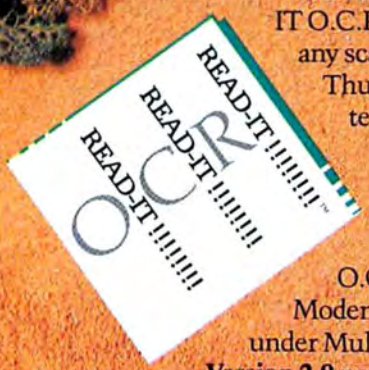
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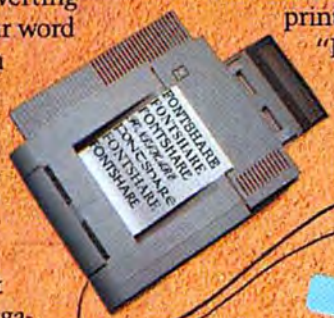
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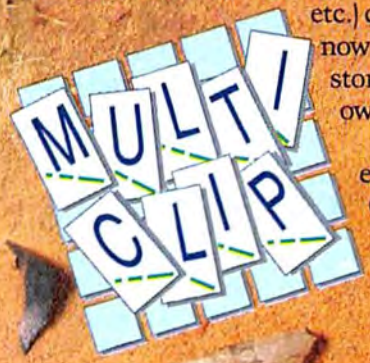
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Letters

Card Tricks in our August '88 issue has a few tips on scripting that you might find helpful. — JF

CLEF NOTES

I read with interest Paul Lehrman's article about his tribulations in creating publication-quality sheet music in your July issue. I have a lot of respect for Mr. Lehrman. But reading his tortured process for creating printed music using Deluxe Music Construction Set made me so nervous that I had to go outside and shoot baskets in the middle of the article. It was like watching someone write a doctoral dissertation using MacPaint.

I decided to see how long it would take me, using Professional Composer, to do the song *Fire in the Glen* that you reproduced on page 224. Doing the notes, text underlay, and formatting to make it close to Mr. Lehrman's example took me 12 minutes. I estimate that after adding chords, instructions, and titles and extra verses (with PageMaker), it would take a total of about half an hour for finished copy.

It looks like things will only be getting better in the near future, as the second-generation music programs hit the shelves. If I were making my living as a music engraver, I'd take some Macintosh lessons. The handwriting is on the screen.

BILL STEVENS
WINSTON-SALEM, NC

In many ways Professional Composer is a superior program to Deluxe Music Construction Set, but you cannot export images from Professional Composer to any other application, including PageMaker, except in bitmap form. I needed more flexibility than the program allows, so it was unusable. By the way, I'm afraid some of the second-generation programs are going to make musicians' and publishers' lives worse, not better. But that's another article (see "The Write Staff," in this issue). — Paul D. Lehrman

DVORAK PROS AND CONS

An item in the June '88 New on the Menu exaggerated the advantages of the Dvorak keyboard (which rearranges the keys using a more effi-

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Letters

cient layout). It cited the claim that Dvorak reduces a typist's efforts by a factor of 16; this is not true. A study reported in *BYTE* magazine (February '86) showed that the fingers of a typist producing 70 words per minute for 50 minutes per hour for eight hours would travel about 1.63 miles per day (not the 16 miles so often quoted by Dvorak enthusiasts) using the QWERTY keyboard, and about 1.17 miles using the Dvorak layout — less, to be sure, but not dramatically so. The effort of relearning to type on a new keyboard hardly seems worth the trouble, given the small difference.

MARK RILEY (40 WPM)
CAPAY, CA

We don't know whose data is the most realistic. But even the modest 28% reduction in finger travel cited by Mr. Riley translates into increased productivity and reduced wear and tear that could be well worth teaching those old digits some new tricks. — JZ

DVORAK PROSE AND CONSCIENCE

I honestly never thought I'd see the day when I agreed with John Dvorak, especially on every word in one of his columns. But his "Armageddon '88" (July '88) sums up the truth surrounding the Apple versus Microsoft and Hewlett-Packard legal suit. He doesn't go far enough, however. (I never thought I'd say that!) To the next person who suggests that Apple is wrong to protect its inventions and other company assets: I'm coming over to set up my own living quarters on your property. You *will* let me live off your land, won't you? After all, I'm a human, too, and all I want to do is make a profit using something you developed and own, so I can eventually get rid of you. All the grousing shows me that there are very few business people in this business.

Thanks, John. Now write another one I agree with.

ROGER HART
MERRIMACK, NH

Although I am a confirmed Mac user, I do have a toe in the other camp, put there by a wife whose business is the Canadian distribution of certain MS-DOS software. Accordingly, I occasionally stick my beak into the offerings of one of your sister publications, *PC Magazine,* and have recently stumbled across the April 12, '88 issue in which John Dvorak expresses profound fears that the MS-DOS world stands a very decent chance of hoisting itself on its own petard with the introduction of OS/2, because of a less-than-perfect implementation of the graphics interface, a less-than-sincere commitment by Microsoft to the mouse as a principal user device, and a good deal of confusion among hardware and software developers as to where the whole thing is leading. He concludes by saying that, unless things change, IBM users will be driven to the "weird world of the Apple Macintosh sooner than imaginable."

Since it would appear from the masthead of your publication that there are a few dozen individuals whose job it is to get the thing out the door every month, and since your sole collective mission in life is to promulgate the tidings concerning the Mac, you and quite a few colleagues are living at the very center of Mr. D.'s "weird world." Notwithstanding the obvious observation that your anti-editor has carried the act of *lèse-majesté* to new heights in biting the hand that feeds him (I presume you do remit to him some small stipend) through the use of personal invective, I could not help but wonder whether you do anything special to cause him to think of you as "weird." Do you put on funny hats and noses when obliged to meet with him? Do you speak with him in long-forgotten ancient languages? Do you write his paycheck on Saran Wrap?

DAVE PHIPPS
GUELPH, ONTARIO

"Armageddon '88" as an opinion piece is both literate and entertaining — up to Mr. Dvorak's usual style. Two unrelated salvos buried in his text, however, deserve closer scrutiny.

Mr. Dvorak views Apple developers who wish to move to IBM as people motivated solely by greed. I always thought that (at the risk of sounding melodramatic) America was built on free enterprise. If some people choose to program for IBM because they see the sense (and cents) in it, I say "more power to them." My love of the Mac doesn't blind me to the basic problem of putting food on the table.

But the item I found more objectionable by far was his suggestion that "Sculley should then give his wife to some white slavers . . . ," suggesting that Sculley's wife is a piece of property "owned" by him, to do with as he pleases. The persistence of this damaging attitude — even in a piece designed to entertain — shocked me and can only be detrimental to a magazine that has so often shown itself to be aware of such issues.

MARTIN WIXTED
JERSEY CITY, NJ

SCS APPEAL

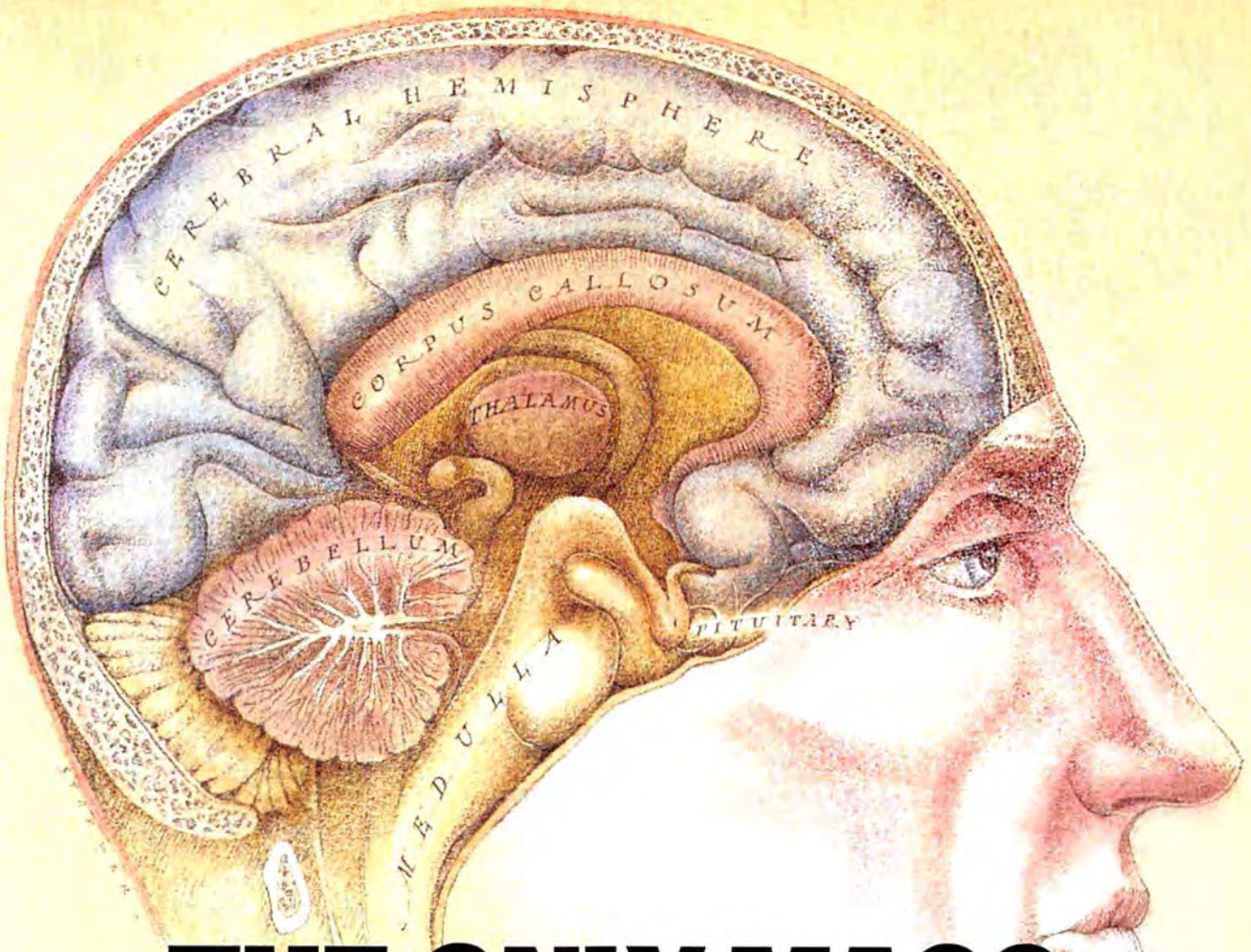
I'm not one to build walls between people, but when I learned my Mac etiquette, the acronym "SCSI" was pronounced "sexy." Imagine my shock when, on page 134 of the June issue, *MacUser* proclaimed that SCSI is pronounced "scuzzy." I believe that Mac users are human, sensitive, and artistic; we say "sexy," whereas those who were forced to learn the arcane commands of MS-DOS (on low-resolution monitors) say "scuzzy." Which usage is correct?

DON SKELLY
LINDEN, NJ

Our phone calls to William Safire and Miss Manners were not returned, so we'll have to improvise. An informal survey showed that "sexy" is more common on the East Coast and in MS-DOS shops, while "scuzzy" is predominant in the West and in the Mac community. (Mac users have other things that they find sexy.) — JZ

WAVE BYE-BYE

Regarding your April '88 article on Crystal Quest: bigger and better things past Wave 40, my foot! Having frequently played into Wave 43 before finally collapsing, I can say with some certainty that there are no discernible changes past Wave 40. Sorry to ruin the suspense for everyone out there



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David Brandt, MacWEEK, January 19, 1988

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Jan L. Harrington, MacUser, November 1987

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Letters

who has been spending too many hours glued to the Mac, but it was a letdown for me, too. Maybe you meant Wave 80?

ANN GREENBERG
BROOKLYN, NY

We meant Wave 400, OK? Now don't bother us again until you've proved us wrong. — JZ

GOING FOR THE JUGGLER

I question the editorial standards in the comparative product review "DAs of Our Lives" in the May '88 issue of *MacUser*. I was confident that our Font/DA Juggler Plus would get an "equal opportunity" from your publication. Unfortunately, this has not been the case.

The misleading information begins with the article's title and description in the table of contents, which says "You want to stuff as many fonts and DAs as possible onto your Mac." This merely describes the limited capabilities of the other product discussed in the article, Suitcase.

The complete article is erroneously summarized when it states that "Both [products] do essentially the same thing." Apparently your reviewer feels that your readers would not or could not do any more with their Mac than your reviewer is capable of. I fear that your reviewer would find MacPaint and Adobe Illustrator "essentially the same thing" because all that your reviewer is capable of doing is drawing circles and squares. Ten of the sixteen major features of Font/DA Juggler Plus (for font face/style viewing and printing, Fkeys, numbering/naming conflict resolution, and sounds) that are printed on page one of the manual are either completely ignored or grossly misrepresented. These features were carefully implemented to increase the productivity of first-time users and to maximize the users' hardware capabilities.

LARRY DAVIS
VICE PRESIDENT, ALSOFT

GO SOUTH, YOUNG MAN

This letter is in response to Steven Bobker's column on "The CD-REVolution" (July '88) wherein he



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Letters

questions the nonvolatility of hard disks. He writes that "if there is anyone reading this who has had a hard disk operational for a year or more and who hasn't had it go south at least once, please let me know. I'd like to send you a MacUser Labs T-shirt." I currently own a SuperMac DataFrame XP-20 hard disk that was purchased in April 1987 and that has been hard at work since that time; it has not failed me in any way. It has also survived a flight from San Francisco to Los Angeles (I hope this is not what Mr. Bobker means when he says "go south"!) and back again.

I take an extra-large.

ADAM R. TALCOTT
LOS ALTOS, CA

MANAGEMENT POTENTIAL

We at AEC Management Systems would like to make some comments regarding *MacUser*'s recent review of our AEC Information Manager. AEC I.M. was designed by an architectural engineer for the express purpose of aiding project managers who track and manage the various events and paperwork during design and construction. Our target audience has expanded to include Fortune 500 project managers. But AEC I.M. should not be confused with what is commonly understood as "project management" software. Our Project Log and Submittal Log fields are designed specifically for continually tracking calendar events, change events, submittals, and transmittals that can be worth hundreds of thousands of dollars to the project manager and his firm.

"Firm" is the key word here. Our product is not normally purchased by individuals on a limited budget (or middle-level paper pushers, as suggested by the reviewer — this demeaning label shows that she does not relate to what she thinks is our target market), but by corporations or professionals who need to leverage the efficiency of people who are responsible for the allocation of large resources of time and money. These people do not find our product inordinately expensive compared with its benefits.

A vertical-market product is often compared with general-purpose products that may be more versatile or more powerful and that, because of their general nature, can reach a much broader market and can therefore be sold at a much lower price. For example, 4th Dimension has the same list price as our product and can do many things that AEC I.M. cannot. But learning and customizing a generic database to serve the needs of a specific group of users is a process that can involve hundreds of hours. In contrast, we have developed a product that is ready to use right out of the box and that has features not found in any other program.

FREDERIC W. UNGER
VICE PRESIDENT,
AEC MANAGEMENT SYSTEMS

UNADULTERATED ADS

Shame on you, *MacUser!* How could you accept advertising for "adult" graphics (in the entertainment/games section of MacUser Marketplace)? Are you in such a serious financial bind that you would risk offending a large portion of your readership by publishing such a blatantly sexist ad? I would remind you that you are not the sole source of Macintosh information.

DEBORAH D. MASON
CAMBRIDGE, MA

We accept only advertising that is accurate and fair and that serves the interests of our readers. Any software publisher that can afford to advertise on a regular basis would appear to be serving the interests of at least some segment of our readership. Some readers are offended by the existence of (and advertisements for) "adult" software, others by software that promotes connectivity with MS-DOS machines — we have to depend on our own sense of decency, decorum, and common sense to help us decide where to draw the line. (Incidentally, only a magazine relatively free of financial binds can enjoy the luxury of occasionally taking the risk that some of its readers will be offended by something appearing in either its editorial content or paid advertising.) — JZ

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Contains all of the "superior" features in Font/DA Juggler Plus and more. MasterJuggler can also - juggle applications and their windows - assign and compress sounds - string applications or sounds together - find and print name or number conflicts in fonts, DAs, FKeys, or sounds - play or convert most sounds - and let lots of people enjoy it all at the same time. Here's what some of these features can do for you:

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- **NEW "Application List"** allows selection from running and pre-defined applications, including frequently used documents. And, it has the option to hide windows as you change applications in MultiFinder.
- **NEW "ResConflicts™"** shows and prints any name or number conflicts for fonts, DAs, FKeys, or sounds.
- **NEW "Multiuser Versions"** available to allow multiple copies of the same MasterJuggler to run on the same AppleTalk network concurrently.

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The "superior" utility that provides unlimited access to fonts, desk accessories (DAs), FKeys and Macintosh® II sounds.

Invaluable for desktop publishing! Allows simultaneous access to as many as 255 fonts and will instantly display them in their own face and in multiple styles. The **NEW "Resource Resolver™" utility** (included) automatically resolves font and sound resource numbering conflicts.

Network users of AppleShare™, TOPS® and MacServe™ need only put one of their purchased sets of screen fonts, DAs, FKeys and sounds on the network server for multiple Macintoshes to use them simultaneously. This, combined with the unique Font/DA Juggler Plus font compression, frees valuable disk space. **NEW "Multiuser Versions" available** for network users.

What about similar programs? Here's what people in the "know" have to say:

"...ALSoft's Font/DA Juggler Plus [is] the superior program." - Henry Norr, **MacWeek Magazine** "...it [Font/DA Juggler Plus] is superior..." - Steven Bobkor, editor, **MacUser Magazine**. "...overwhelmingly superior performance..." - C.J. Weigand, **MACazine**. "...clearly offers many more features...I find [it] to be a better value." - Tom Negrino, **MACWORLD**

ALSoft, Inc. / P.O. Box 927, Spring, Texas 77383-0927, (713) 353-4090

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Letters

Shame on you, *MacUser!* Are you in such a serious financial bind that you would risk offending a large portion of your readership by publishing such a blatantly sexist ad?

MOUSE TRAP

There is a growing Mac community here at Clemson University, and *MacUser* is the magazine most often recommended. However, one of your best distinctives, the MiniFinders section, is becoming more than misleading. Old four-mouse-rated programs would be rated one-mouse today. To judge from the MiniFinders, Enchanted Scepters is better than the newly reviewed and underrated Apache Strike. What a joke! Your reviewer probably just didn't have the necessary skill to enjoy the game. It would be like giving Dark Castle a bad review after playing it for only four or five hours.

I suppose, if you print this, you will edit it to read "*MacUser* is the most often recommended magazine." How about printing the whole letter for the sake of honesty?

RANDY PETERS
CLEMSON, SC

Well, we thought about editing your letter down to: "Clemson University . . . become[s] . . . an . . . old . . . joke . . . after . . . only four or five hours," but decided to give you guys a break. But seriously, we recognize the need to update our MiniFinders and rating system. We'll be making some changes in the near future; let us know what you think. — JZ

I KNOW THAT REPORT IS IN HERE SOMEWHERE.



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EDITED BY LOUISE KOHL

See Dese CDs

CDs aren't just for audio anymore. By the time you read this, NEC Home Electronics and Apple should both be shipping their CD-ROM drives in quantity.

NEC's unit, the Intersect CDR-77, marks the firm's first foray into the Mac market. The CDR-77 is a front-loading drive that uses a caddy, just like the Apple unit, and it can read both Mac-compatible and High Sierra-formatted CD-ROMs. It can also play audio CDs. NEC's drive comes complete with all the cables, a terminator, and CD caddy, and lists for $999.

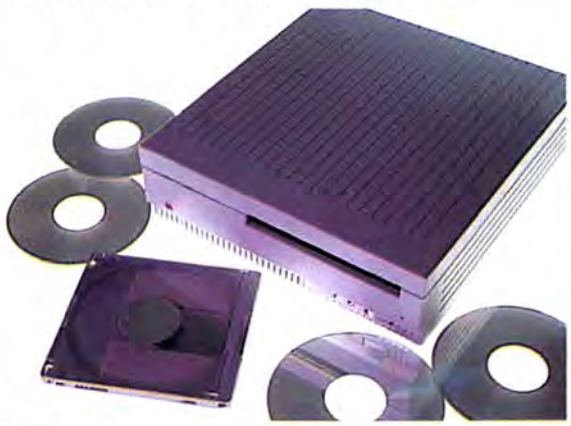
The AppleCD SC fits under a standard Mac, and can read both HFS and High Sierra-formatted CD-ROMs. It, too, can play audio CDs, and comes with a remote control desk accessory that lets you operate the player from your Mac. Apple's drive comes with a CD caddy, but not the cables or terminator. It lists for $1,199.

To find out more, contact NEC Home Electronics, 1255 Michael Drive, Wood Dale, IL 60191; (312) 860-9500; or Apple Computer, 20525 Mariani Avenue, Cupertino, CA 95014; (408) 996-1010.

— Russell Ito



NEC's Intersect CDR-77 marks the company's entry to the Mac market. The CDR-77 reads HFS and High Sierra, as well as playing audio compact discs. It costs less than Apple's model and includes the cables.



The AppleCD SC CD-ROM drive can read both HFS and High Sierra data discs, and can play audio CDs. It comes with a Remote Control desk accessory but not the required cables or terminator.

In Memoriam

James Lee Loper, better known as Jimmy or "HyperCardarian," was a frequent voice on CompuServe's MAUG. We all knew him as gentle, witty, and full of information. He had a great number of on-line friends, many of whom did not know that Jimmy's home address, since 1984, was a bed in The Children's Hospital in Denver. He had suffered from an inoperable spinal tumor since the age of five. He spent much of his time making friends through his Macintosh and taught us all that the indomitable human spirit is no cliché when you meet it in real life. He once described himself as "a very patient patient."

HyperCardarian died June 18, 1988. He was 21. Contributions may be made to The Children's Hospital, in care of Lewellen Memorial Chapel, 503 Terry Street, Longmont, CO 80501.

— Louise Kohl

Is It Blue?

DOS scoffers beware! Your favorite Mac programs may soon appear on the blue side of the street, and what's worse, you may not even realize it! Screenplay Systems, a company that until now has concentrated on applications for the motion-picture industry, has just announced the Macintosh Compatibility Package (MCP), which allows a Mac application written in C to look and perform exactly the same way on a DOS machine.

MCP requires 110K RAM, and it's completely graphics based, supporting VGA, EGA, Hercules, and CGA displays on the PC side of the world.

Screenplay Systems hasn't announced its plans for MCP, other than its implementation in its own programs Movie Magic Scheduling/ Breakdown and Scriptor; developers across the country are practically drooling at the possibilities. Meanwhile, Apple's lawyers are doing the same, but for different reasons.

Screenplay Systems is located at 150 East Olive Avenue, Suite 305, Burbank, CA 91502; (818) 843-6557.

— Russell Ito



So who's blue? The Macintosh Compatibility Package (MCP), from Screenplay Systems, has developers drooling at the possibilities. Using MCP, you can run programs written in C on DOS computers with the same functionality as on a Mac.

A Hot Trio

Southworth Music Systems has just announced a trio of signal-processing cards for the Mac II that'll knock the socks off any audio jock (or jockette, as the case may be). The three Max Audio boards (due out by the time you read this) all use the Motorola 56000 signal-processing chip to achieve a level of fidelity that's reportedly better than compact discs.

Some applications for these boards include direct-to-disk recording and editing for audio post-production and digital mastering, real-time spectral analysis, and sound effects synching for film and video.

The Max Audio Analog Card performs all its A/D (analog-to-digital), and D/A (digital-to-analog) conversions using a proprietary 20-bit converter that yields a signal-to-noise ratio of 104 decibels on recording and 120 decibels on playback. It supports sampling rates of 44.1 kilohertz (CDs), 48 kilohertz (DAT and professional digital recorders), 96 kilohertz (2X oversampling), and 192 kilohertz (4X oversampling). Southworth ships the Analog Card with direct-to-disk recording and playback software, and real-time stereo spectral analysis software (64 to 256 audio bands). The Max Audio Analog Card lists for $1,400.

The Max Audio Quad 56000 DSP Card provides signal processing for effects such as reverb, pitch tracking and shifting, sample playing, and additive synthesis. The Quad DSP Card also lets the user expand the 56000's on-board RAM with an additional 3 megabytes of shared memory for storing samples, and it operates at a blazingly fast 68 MIPS. It, too, lists for $1,400.

The Digital Audio/SMPTE Card does two jobs: It can send and receive data in AES/EBU Digital Audio format, which makes it possible to record CD and DAT signals digitally, and it also provides a SMPTE time-code reader/generator. This feature makes it possible to lock the Mac's recording or playback speed to an external multitrack tape recorder or VCR. Its suggested list price is $995.

Because these are serious tools, Southworth has established the Max Audio Certified Developer Program, providing developer discounts, licensing, and support, and they are also offering OEM and VAR discounts. Southworth Music Systems is located at 91 Ann Lee Road, Harvard, MA 01451; (617) 772-9471.

— Russell Ito



Forget Max Headroom. We're talkin' Max Audio! Southworth Music Systems' amazing line of signal-processing boards for the Mac II provides audio fidelity that's better than compact discs'.

Joining the Fight

The Software Development Council, a Palo Alto–based national alliance of software trade organizations (with more than 1,000 member companies) recently started up a combined developer-legal task force to fight the current rash of computer viruses.

The developer members of the SDA see viruses as the most serious threat currently facing the software industry. Though actual viruses have been rare, the real danger is not in the actual damage (as serious as that is) but in the erosion of public confidence.

SDC will gather and circulate information about virus-resistant programming techniques. While it's not possible to be sure any code is 100 percent virus-resistant, there are programming tricks and techniques that will inhibit the self-replicating characteristics that viruses use to spread themselves. It is SDC's goal to get all commercial software to incorporate such protective code.

Lawyers from firms that are SDC members are coordinating an effort to identify viruses legally and to use those definitions in legislative proposals that will make the dissemination of viruses illegal.

— Ellen Hirame

From Here to Farbuktu

Pop quiz: What do a group of islands off the Northern California coast and a town in Mali have in common? If your answer was the merger of Farallon Computing and WOS Data Systems, you're either very good at deciphering cryptic headlines, or you cheated.

Farallon Computing, makers of PhoneNet, and WOS Data Systems, makers of Timbuktu, have merged. Farallon will now market Timbuktu, which allows one or more Mac users to view (or control) activity on another Mac anywhere on the same or a bridged AppleTalk network. Using Timbuktu, several people can work together to create a single CAD/CAM drawing, or a committee can get together to design a horse.

In addition to the merger, Farallon also announced two new products. Timbuktu Remote allows Timbuktu control via a modem. At our demo, a computer in a conference room, locally controlling a computer on someone's desk, instructed that machine to call another computer 2,000 miles away, which in turn was used to view the display of a fourth computer, a LaserShare print spooler at the remote location.

The second product, Katmandu, is a QuickDraw recorder. Once you turn it on, it records all keystrokes and mouse actions and then plays the sequence back on demand. And, yes, an XFCN comes with it, which allows you to play the recorded QuickDraw sequences from within HyperCard. And, yes again, you can use Katmandu in conjunction with Farallon's MacRecorder sounds to produce complete audiovisual presentations. This one is *hot.*

The prices for Timbuktu, Timbuktu Remote, and Katmandu had not been set by press time, but you can check them by contacting Farallon Computing at 2150 Kittredge Street, Berkeley, CA 94704; (415) 849-2331.

— Henry Bortman



Direct MICRO

3.5" DS/DD	$1.19 ea. qty. of 100 $1.29 ea. qty. of 10
Includes user labels - 100% lifetime warranty	
SONY Diskettes	$1.59 ea. qty. of 100 $1.79 ea. qty. of 10
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Toner Cartridge Useful life 3000 pages-NEW cartridges LaserWriter® & LaserWriter Plus®	$99.00
ImageWriter Ribbons Black Colors (Yellow, Orange, Green, Red, Blue, Purple, Brown) 4-color	$2.50 ea. $2.95 ea. $7.95 ea.
Continuous Form Computer Paper 2700 sheets, Bright white, 8 1/2" x 11", 20# Bond, Clean-perf * $34.95 for MST or PST customers due to shipping	$29.95*
Disk Holder Holds 40, 3.5" micro diskettes. Five adjustable dividers	$5.95

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NEWS LINE!

Tangent Technologies Terminates

NORCROSS, GA — After a three-year financial struggle, **Tangent Technologies,** one of the leading manufacturers of AppleTalk-compatible connectivity devices, has closed. The closure, effective July 1, left a big gap in the market and immediately sparked speculation as to who, if anyone, would pick up Tangent's products, which included Tangent MCA, an AppleTalk interface board for IBM PS/2 machines; TangentShare, a PC-based AppleTalk file server; and TangentSpool, an intelligent AppleTalk PostScript print spooler. Among the companies expected to bid for Tangent's products are **Dayna Communications, Banyan Systems, Tektronix,** and **Adobe**. One company that has already stepped into the void is **Entech Datacomm**, which should be introducing its MACLAN Connect, an AppleTalk protocol file server, at about the time you read this.

Montage Announced and Shipped

SUNNYVALE, CA — **Presentation Technologies** stunned the computer press by announcing and shipping its Montage Film Recorder (FR1) on the same day. The FR1, the first in a planned series of presentation devices, can produce slides with over 16-million colors, full bit-map graphics, and 4,000-line resolution. It supports both Mac and PC environments — simultaneously — and can be shared over an office network. Fully digital, it can rasterize and complete a 4,000-line image in one to three minutes. The FR1's list price is $5,995.

Mac Today, Gone Tomorrow

SAN FRANCISCO — *Macintosh Today,* PCW Communications' Macintosh trade magazine, has ceased publication. The end came swiftly, following several weeks of speculation about the magazine's imminent demise. The announcement caught many staffers — and Apple Computer — by surprise.

Blyth Spirit

FOSTER CITY, CA — **Blyth Software** has signed a letter of intent to acquire **Corporate Class Software**, a division of Celanese Corp. Under the proposed consolidation, Blyth would move its U.S. corporate operations to New York. Blyth has been without a U.S.-based president since March, and Blyth Chairman Paul Wright has been filling that job in the interim. The plan, which Blyth expects to be finalized by the end of the summer, would keep Blyth's technical support and western regional sales offices in California. The development staff would be concentrated in England, where the company originated. Blyth's U.S. development team is not expected to make the trip.

Thin Bits

Icon Review, a mail-order software and accessory retailer, has filed for reorganization under Chapter 11 . . . **Claris** has acquired **Nashoba Systems**, thereby adding FileMaker 4 to its roster. The purchase also ended the preliminary discussions between Nashoba and **Orange Micro** for the purchase of Ragtime. Nashoba's development staff will remain in Concord, MA, while some of the Foster City, CA, personnel will be moved to Claris. Nashoba will continue to provide technical support for FileMaker 4 . . . **Letraset** has purchased the marketing rights for **Manhattan Graphics'** presentation package, ReadySetShow. Letraset will now provide technical support for the product . . . **COMDEX/Fall**, in Las Vegas, should be even more confusing than usual with the addition of a ninth exhibit location . . . **Language Systems** has started shipping its FORTRAN Compiler version 1.0. The compiler includes VAX-compatible extensions.

SYMANTEC UTILITIES SHOULD BE ON EVERY HARD DISK FOR THE SAME REASON AIR BAGS SHOULD BE IN EVERY CAR.



Hard disk crashes happen for millions of reasons. Or no reason at all. You can't stop them with static guards. And even surge protectors don't help. The only fool-proof way to protect yourself is to be prepared before the crash. In cars they use air bags. For hard disks it's Symantec Utilities for Macintosh (SUM), featuring Guardian.

Like an air bag, Guardian stays out of sight, loading automatically every time you turn on your Mac. It protects invisibly by updating a "map" of your hard disk data. So that, in a crash, your data is safe. Because Guardian uses the "map" to locate it easily. And recover it in minutes.

Bundled exclusively on all Jasmine Hard Disk Drives.

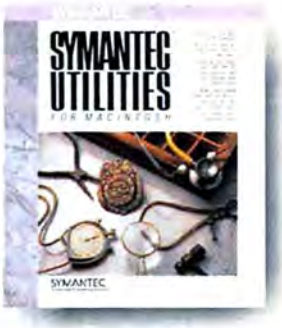
SYMANTEC UTILITIES FOR MACINTOSH:
Guardian—protects and restores hard disk data and deleted files. *Disk Clinic*™—easy-to-use troubleshooting interface. Restores hard disk data and deleted files in case you have a crash before you can install Guardian. *Virus Protection*—protects systems against "viruses." *HD TuneUp*™—optimizes hard disks. *Symantec Tools*—views and edits data and resource forks of a file or volume in HEX or ASCII. *QuickCopy*™—makes fast floppy copies. *HD Partition*™—separates hard disks into separate volumes which can be encrypted.

Other recovery programs work only after a crash without a current "map." That means they have trouble even finding your data. Much less recovering it.

And if you back up your hard disk as infrequently as most people, a crash could cost you days, weeks, even months of work. But with Guardian, you can recover data stored up to the second before a crash. So you won't lose even a second of work.

For fast data recovery and effortless disk management, all seven Symantec Utilities are as indispensable as Guardian. They're an advanced version of the best-selling Mac Zap by Micro Analyst, Inc.* Call now to order on our 30-day money-back guarantee. For only $99.95, Symantec Utilities for Macintosh is the guaranteed way to keep a hard disk crash from sending you through the roof.

See your dealer or call:
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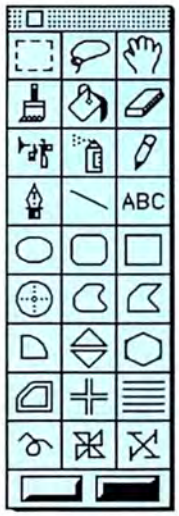


We've been asked why Cricket Software would introduce a black and white paint program when the whole world is making so much noise about color. Frankly, we feel it's obvious: There are more than 1.5 million* monochrome Macintosh® users — Apple® hasn't abandoned them and neither have we. Plus, we felt there was still a lot of room for improvement over the current best selling paint program.

So, we revved up our monochrome Macintoshes in the best Cricket Software tradition and developed the new standard: Cricket Paint.

Feature-rich power

Cricket Paint is loaded with features. Powerful features with more capabilities than you thought possible.



Our FreshPaint™ feature treats your newly painted artwork as an object, completely flexible until you deselect it to create "dry paint" bitmap images. Create, edit and output documents at resolutions from 72 dpi to 300 dpi.

Create your own textures and tools. Then save them for future use.

In addition to the standard Cricket Paint format, you can import or save your files in TIFF, MacPaint™, and PICT formats.

Another member of the First Family of Graphics

Cricket Paint is the latest in the Cricket family of graphics productivity software, Cricket Graph, Cricket Draw, Cricket Pict-O-Graph, Cricket Presents, Cricket Expression Device Drivers. Cricket Software. The leader in graphics productivity software.

*Based on market studies.

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CLARIFICATIONS

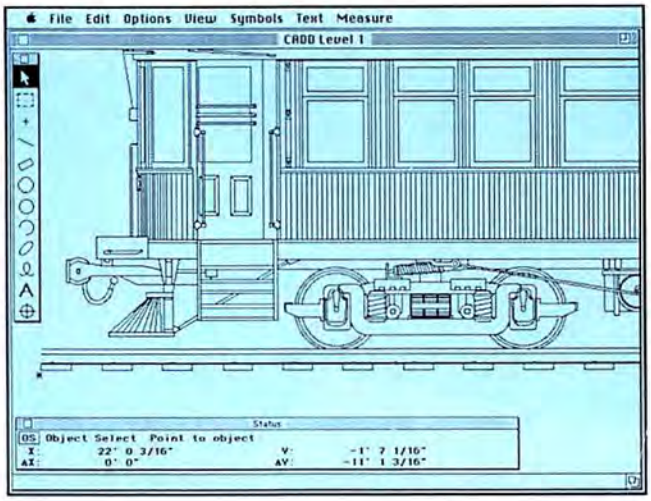
Obfuscations obviated, ambiguities arbitrated, and errors eradicated.

FLIP, FLOP THE CHART IS WRONG

In our August '88 MacUser Labs report, "Black and White & Read All Over," two of the headers on our Phosphor Spectrum Test chart, on page 123, got flip-flopped. The Portrait monitors were misidentified as Landscape, and vice versa. Sorry.

MAIL ORDER ORDER

In a letter in our August '88 issue, a reader complained that the salesperson at The Saving Zone (now The Mac Zone) couldn't tell him if SuperLaserSpool worked on a Mac II, which then trapped him in a Catch-22 of having bought a product he couldn't use or return. We checked with The Mac Zone and found them willing and able to provide compatibility information on request. Not only that, they're implementing a database to track each customer's configuration, and to preclude the possibility of shipping you software you can't run. We're impressed, and Robert Wilkins, the company's president, is rightfully proud of the fact that, unlike most mail order houses, they also have a full-time staff providing technical support. We apologize for any problems this letter may have caused The Mac Zone.



A generic prescription. Generic Software's new CAD package, Generic CADD Level 1, is the first in a family of CAD programs. And at just $99.95, maybe it *should* come in a white wrapper with blue type.

CAD for the Masses

Generic Software doesn't put a lot of hype into its name. Its new Macintosh product, Generic CADD Level 1, tells it like it is — an entry-level drafting and design program. But the bland name doesn't mean there isn't any pizzazz behind the program.

The object-oriented graphics program allows up to 256 layers of objects in a drawing. It supports multiple windows and has precise manipulation tools, including rotation and scaling. In addition to a powerful zoom capability, the program lets you set ten views of a drawing that can be returned to at any time. The program also supports PostScript. Fifteen symbol libraries, such as Basic Home Design and Electronic schematics, are also being offered separately.

Generic plans to dole out its CAD software in doses — a level at a time for beginners through professionals. Level 1 is targeted at home users and students for the relatively low price of $99.95. It requires 1 megabyte of RAM. Subsequent levels will add more professional CAD features and support for plotters. Generic Software has used a similar marketing approach for their MS-DOS CAD packages.

You can reach Generic Software at 11911 North Creek Parkway South, Bothell, WA 98011; (206) 487-CADD or (800) 228-3601.

— Ben Templin



They may look like trash compactors, but they can keep your Mac from being turned into trash. They're two of EPD's Line Star series of AC line conditioners.

Safety Lines

Power surges are usually things you worry about just after a big one has melted your Mac's power supply into a lump of smoking metal. It can happen, and when it does, that power strip you've got on the floor will be as useful as a sieve on the Titanic.

If you find this scenario scary — or worse yet, familiar — you should check out the Line Star series of line conditioners from EPD (Electronic Protection Devices). The five models range in capacity from 300VA to 3KVA and can correct for line fluctuations from 84 to 138VAC, while maintaining the output to load to within plus or minus 6 percent of 120VAC.

The Line Star units range in price from $429 to $1,299 and are available from EPD, 1045 S. East Street, Anaheim, CA 92805-8508; (714) 520-0881.

— Russell Ito

Apple Says Keep 'em Satisfied

We thought that that's what companies were supposed to do all along. But maybe that's not obvious in the corporate climate of the late 1980s.

In any event, boldly taking the bull by the horns, Apple has established a Customer Satisfaction Group. These folks will be responsible for "customer relationships," [*Sounds like a dating service. — Ed.*] and the group, in Apple's words, will be "aligned with the company's ongoing efforts to create a scalable organization that is close to its customers and positioned for growth in the Nineties."

Translated from MBA-ese, that seems to mean that if you call Apple with a problem, you might not be told to call your dealer, or you might be told in a nice way. Or maybe it just means Apple always has your happiness in mind. In the meantime, we'll investigate and let you know what this all means just as soon as we figure it out.

— Hannah Tyree

Applications Now Being Accepted

Even the best rhymesmiths need help lassoing a good rhyme — a poet lariat, if you will. And "With all the supplementary dictionaries available (for medical, legal, and other business applications), there is still no rhyming dictionary for the Mac," notes George Starke of Calistoga, CA. Some die-hard traditionalists view rhyming dictionaries as dirty pool, but even rhymemaster Stephen Sondheim has confessed publicly that he uses them — a bombshell on a par with Rosie Grier's revelation that it's OK for pro football players to do needlepoint, so we guess they're kosher in our book.

We've seen rhyming dictionaries for those blue computers but haven't seen one for the Macintosh. And, although such a tool might be worthwhile in HyperCard, we've seen no such stack crack an attack on the Mac track. If there is one, we're certain, alas and alack, to get flak back, Jack.

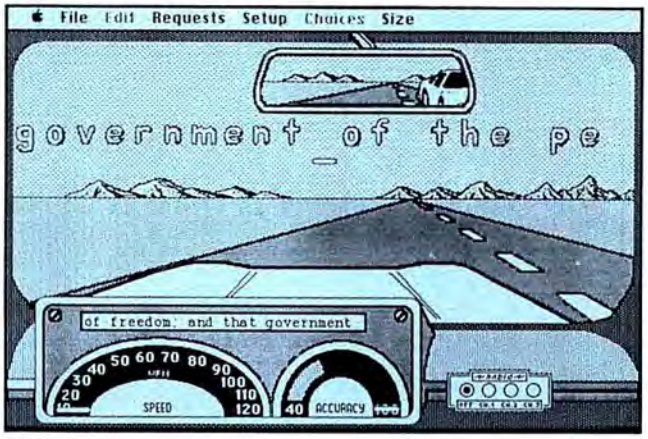
DIVIDE AND CONQUER

We've received several responses to Ms. Dee Forsythe's plea for a fraction-generating DA. Several suggestions have been enumerated, but they offer only fractional solutions — and don't address the problems of the least common denominator. For example, some popular fonts like Beverly Hills and Chic Math include a good selection of common fractions. Fabulous Fractions Fonts, a set of shareware fonts (from Marvin Schwartz, 119-40 Union Turnpike, Apartment 4V, Kew Gardens, NY 11415), lets you create virtually any fraction and an impressive range of complex mathematical expressions — a real bargain for only $10 (if you mention that you read about it in *MacUser*) — but you can't specify the typeface for your numerals.

Michael P. Peratis of Culver City, CA, suggests keeping some of your most frequently used fractions — complete with superscripts, subscripts, and suffixes — in a locked word-processing document; keep that document open while you work on your main document and retrieve your favorite fractions as needed. (You might need to edit the numeric values and/or change the font, but all the formatting will be taken care of.) Unfortunately, this won't work if you use a word processor like MacWrite that can have only one document open at a time. Nonetheless, these options should functionally fulfill most fractional fantasies (where's an alliteration dictionary when you need one?).

If you've got an idea for an application you'd like to see, send it to ANBA, *MacUser*, 950 Tower Lane, 18th floor, Foster City, CA 94404. If we publish your brainstorm, you'll get $25 and a chance to inspire a Mac hack maniac. (Pass the ipecac.)

— Jon Zilber



Abe Lincoln probably knew as much about typing as he did about driving, but Mavis Beacon Teaches Typing! turns typing the Gettysburg Address into a wild car chase game.

Just Your Type

"OK, Alex, I'll take Software Titles for $49.95."

"And the answer is: It's the first Mac application that tells you what Mavis Beacon does."

'What is Mavis Beacon Teaches Typing!'

MBTT! introduces a new character to the annals of software. The mysterious Mavis is an attentive typing teacher who tailors her lesson plan to your abilities and performance; as you improve, the exercises get tougher; when you're in a slump, Mavis decides it's time for a typing game to raise your spirits. There are type-along-with-Mavis exercises, with on-screen accuracy and speed monitors, and periodic report cards to let you know how you're doing (aka "the Ed Koch feature"). There's also hot-rod racing, in which your typing speed controls how fast your car moves. Mavis has a repertoire of intriguing quotes, jokes, and fun facts that she sprinkles throughout the lessons, instead of the usual drivel about quick brown foxes. MBTT! also keeps track of the typing level and progress for individual students, and provides a host of diagnostics to show you where you need the most improvement. You can also toggle between standard and Dvorak keyboards.

For a date with Mavis, contact The Software Toolworks at One Toolworks Plaza, 13557 Ventura Blvd., Sherman Oaks, CA 91423; (818) 907-6789. Incidentally, we hear through the grapevine that two special Washington editions of the program are being developed: "Rosemary Woods Teaches Aerobics!" and "Fawn Hall Teaches Shredding! "

— Jon Zilber

Dream a Little Dream of Mac

Thanks to DreamLight, this Lamborghini Countach can be yours for just two dollars. Unfortunately, you'll have a little trouble driving it off the showroom floor. It's only a poster. Through "High Performance" digital design, illustration, and animation, DreamLight has added a new angle to the question, "Is it live, or is it memory?"

Still rubbing your eyes trying to decide whether this is a mirage or not? Well, you're looking at about 500 solid shapes filled with varying levels of gray and Adobe fonts. The car itself was created using Illustrator on a Mac Plus. PageMaker was used to put this image together with the type. The final output came through the Linotronic 300 Imagesetter at 1,270 lines per inch resolution. So, if you want to own a Countach, but you're not Malcolm Forbes, at least you can get the poster to gaze at while you save your pennies. Send $2 for postage and handling to DreamLight, P.O. Box 28613, Providence, RI 02908.

— Kristi Coale



Introducing the gray-scale version of the Lamborghini Countach! Only from DreamLight.



Novell presents a net even the pickiest

Macintosh owners have a reputation for being fanatical about their Macs. And rightfully so, when you consider the elegance of the Macintosh user interface.

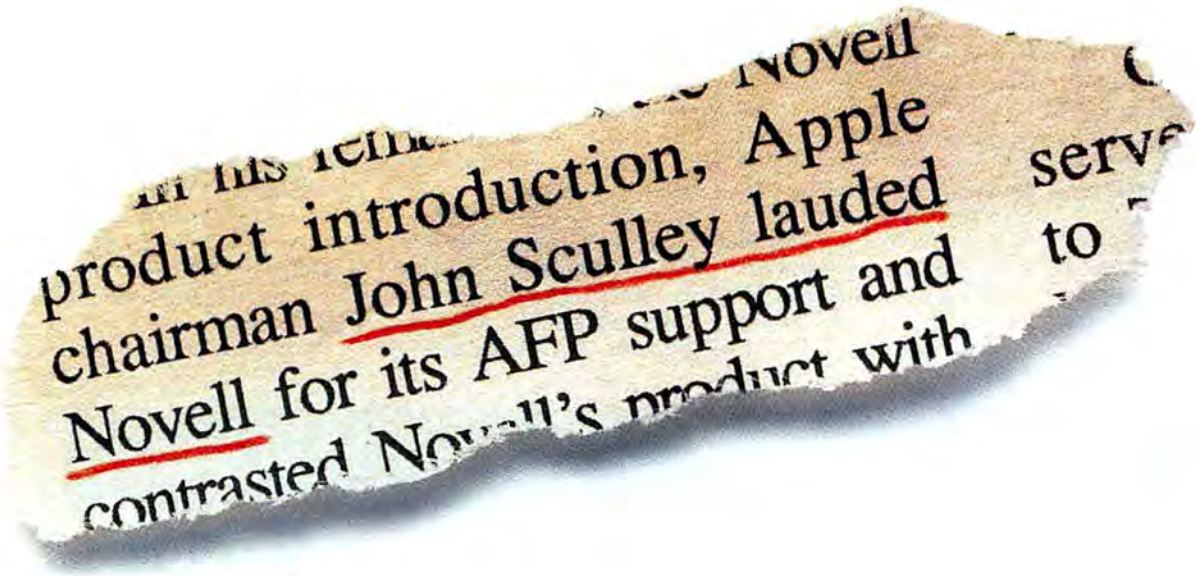
So when Novell set out to network the Macintosh with PCs, it was with one clear caveat: preserve the Mac environment. Create network software that would feel right to the pickiest of all Macintosh users. And none are pickier than the ones at Apple.

Full AppleTalk compatibility. Working directly with Apple, Novell's programmers created a version of NetWare® that is compatible with the AppleTalk File Protocol (AFP). It's an achievement hailed by Apple President and CEO John Sculley as "a very significant event for the industry." And it means that Mac users can now get all the power and flexibility of the number one local area network in the world, without sacrificing any Macintosh functionality.

AFP compatibility also means that NetWare for Macintosh will be fully compatible with future Macintosh hardware and operating system versions. So you can take advantage of new Macintosh product releases as soon as they become available.

Freedom to choose. NetWare for Macintosh lets you connect Macs with a

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InfoWorld, June 20, 1988

work made to satisfy Macintosh user.

myriad of PC, minicomputer and mainframe environments, including OS/2. So you can choose the workstation environment that best suits your needs while communicating easily between dissimilar operating systems and sharing files and peripherals.

You get all the performance, security, fault tolerance and functionality of NetWare without changing the way you work with your Macintosh. And you get the power to transparently connect to over two million NetWare users worldwide.

To satisfy your need for a powerful Macintosh network, plug into NetWare—the network that passed the ultimate Mac test drive. See your Gold Novell Authorized Reseller, or call 1-800-LANKIND.

For more information, call from your modem 1-800-444-4472 (8 bit, no parity, 1 stop bit) and enter the access code NVMC16.

NOVELL

For network solutions, you should be seeing red.

Please circle 124 on reader service card.

IIs and 3.0s

TML Pascal, the first standalone Mac development environment that ran on the Mac, is coming back with a bang. While its original release achieved widespread popularity, it fell behind newer products such as THINK's LightSpeedC and Lightspeed Pascal, and Apple's MPW family. Tom Leonard, creator and publisher of TML, has now completed a full rewrite, which is called TML Pascal II. The Pascal programmers and developers attending the recent MacHack '88 conference greeted the announcement with enthusiasm.

TML Pascal II will run under the MPW Shell, supports Object Pascal (as defined by Apple), can compile MacApp code (the first non-Apple product to do so), and does 68020/68881 code generation. It's the first third-party language to fully support MacApp. It implements all 68881 trig functions, can optionally generate MPW .o and .a files to allow better code optimization, and integrates with all MPW modules (assembly, C, and Pascal).

Each copy of TML Pascal II will ship with the MPW Shell software, which has been licensed from APDA. Also included are three manuals: a tutorial for TML, a reference for TML, and MPW documentation. As with the earlier versions, many source-code examples will be included. The TML Source Code Libraries will also be updated, with new examples covering AppleTalk, serial drivers, and HyperCard.

Current registered TML owners will be able to upgrade to TML Pascal II for $49.95. Retail list will be $125. The product is entering final beta testing as we go to press and was scheduled to ship in August.

For more information, contact TML Systems at 8837-B Goodbys Executive Drive, Jacksonville, FL 32217 or call (904) 636-8592.

Symantec Corporation has announced that they haven't been standing around twiddling their thumbs while others were advancing the state of the art. Their new version of THINK's LightSpeedC will be called version 3.0, and it promises to knock a few socks off.

THINK's LightSpeedC 3.0 sports a stunning new source-level debugger that's the equal of TMON and MacNosy, full 68020 and in-line 68881 math-coprocessor support, precompiled headers for improved compilation speed, support for all five volumes of *Inside Macintosh*, and entirely new documentation.

The new version directly reads projects built with versions 2.01 or later, and you'll be able to use your version 1.02 projects after rebuilding them using version 3.0's libraries.

If you're a registered LightSpeedC owner, you can upgrade to version 3.0 for $69. If you bought Lightspeed after February 1, 1988, your upgrade is free. If you haven't already received an upgrade order form, request one from Symantec.

For more information contact Symantec at 10201 Torre Avenue, Cupertino, CA 95014. For questions on the upgrade process, call (408) 446-9994.

— *Steven Bobker*

RUMOR MANAGER

Now that hardware and chip shortages have proven so lucrative for so many companies, what items do you think will be next to disappear from the shelves? SCSI chips? CPUs like the 68020, 68030, or 80386? Auxiliary chips like 68881s or, gasp, 68851s? We think that 3.5-inch disks are prime candidates for an induced shortage — *and real soon now.* Take a look at them. Many, if not most, are still made in Japan (or elsewhere on the Pacific Rim other than the United States). Demand for them is rapidly increasing as the MS-DOS folks discover that the Mac called the shots right on far more than the graphic interface. And overproduction in 1987 drove prices down to unrealistic lows. If 3.5-inch prices are still low by the time you read this (and we really have serious doubts about that), it would be a good time to stock up.

Acius, 4th Dimension and nothing else, is about to become a more-than-one-product company. Here's what its next few acts will bring: 3rd Dimension, a low-priced, somewhat weaker relational database, able to run 4D programs but not to create standalone applications; 2nd Dimension, a flat-file version (with enormous speed) of 4th Dimension that will seek to exploit the average Mac buyer's proclivity for flat-file databases; and 1st Dimension, for the NeXT machine. All are being programmed by the original 4D programmer.

Now that keyboards flex to fit your hands (like the Tony!), there's only the mouse to upgrade ergonomically. Look for a rash of new ideas in pointing devices. The neatest of those we've seen is the Isopoint (some bits of machined plastic that attach to the bottom edge of the keyboard and which can be operated by your thumbs, obviating the need to remove either hand from the keyboard).

Text retrieval and searching ability are rapidly becoming more important. The current software crop is either relatively slow (Gofer — a good program, and Sonar — a not-so-good program) or limited in conditional search ability (HyperCard). Nothing — so far — comfortably and expeditiously handles really huge amounts of data. MS-DOS programs have been making real strides in that direction recently, and you can expect to see Mac versions of the MS-DOS winners (such as Lotus' BlueFish) as soon as the dust settles over there. Do sit down when you first watch a Mac BlueFish demo. Otherwise the speed and power are going to knock you down.

New accelerator board advances have caught the interest of several large software companies (including one best known for its telecommunications software and another best known for its stackware). They, along with two hardware companies, are negotiating for licenses to build boards employing this new technology. The new accelerators will be as powerful as, and even faster than, the current cream of the crop, the Radius 25. And they'll cost little more than the current low-cost leader, the SuperMac SpeedCard. About $500 will buy you all the speed and power you'd want. How do they do it? As we understand it, the trick involves multiple processing and using the 68000 on the motherboard as a specialized coprocessor. The new boards are about six months off and will work with both SEs and Pluses.

Our inside sources tell us that Microsoft is working on a code module that will self-document the software it's built into. This offers the potential for drastically cutting documentation costs as it improves documentation quality. The material produced will not only be for hard-copy manuals but for on-line context-sensitive systems as well. Since Microsoft is already on top of the heap as far as on-line help is concerned, the new stuff should be awesome. And they're doing their Mac version first, planning to port it over to the MS-DOS.

Have you heard any good rumors recently? Started any yourself that you'd like to take credit for? Can you share your "knowledge" with us? Does your legal department agree? Will you share anyway? If we use your rumor, we'll send you a token of our appreciation and promise not to use your name. Anonymous contributions also accepted. Contact the Rumor Manager by regular, slow, and old-fashioned U.S. Mail or fast and modern electronic mail. Our old-fashioned address is Rumor Manager, care of *MacUser*, 950 Tower Lane, 18th floor, Foster City, CA 94404. Our newfangled electronic addresses are *MacUser* (on MCI Mail), 72257,2671 (on CompuServe), and X0259 (on AppleLink). No calls please, the Rumor Manager has an unlisted number and much prefers it that way.

The Safety Connection

Who's been sitting in my chair — using my computer? If you ask this question as often as some of us do around here, you may be thinking of chains and padlocks for your Mac. A better solution for protecting your data and hardware might be the PC Guardian Keyboard Lockout for the Mac SE, from Micro Security Devices.

The Keyboard Lockout system consists of the Keyboard Lockout, the Port Lock, and two interchangeable keys. Your keyboard cable is inserted into the Lockout unit. When locked, this unit disables the keyboard. The Lockout unit's own cable fits into the CPU through the Port Lock box. When the Port Lock's cover plate is installed, the cable cannot be removed.

Installation of the Keyboard Lockout requires only a Torx screwdriver (supplied) and takes just a few minutes. It sells for $79.95. The Mac II edition lists for $89.95. The PC Guardian Power Switch Protector locks your on/off switch and prevents theft of internal boards. It will be available for $89.95.

For more information, contact Micro Security Devices at 118 Alto Street, San Rafael, CA 94901; (415) 459-0190 or (800) 882-7766 outside California.

— Laura Johnson

You are cordially invited
to send your HyperCard stacks to
Flash Cards for review
to
MacUser Magazine
Attn: Flash Cards
950 Tower Lane
18th Floor
Foster City, CA 94404

Who needs pen and ink? With Judith Sutcliffe's Flourish font, the calligrapher's art is yours for the typing. Abelard & Troubador fonts also come with a set of wildflower initials that recall the grand style of illuminated manuscripts.

Pomp and Circumstance

Titles, invitations, award certificates, poems — all can be created in display calligraphy (24 point and larger) when you combine Flourish and your Mac.

Flourish, The Calligrapher's Typeface, contains a basic uppercase and lowercase alphabet, flourished capitals and lowercase, full ligatures, Roman and old-style numerals, and lowercase international accents.

Designer Judith Sutcliffe created Flourish in Altsys' Fontographer, taking advantage of its automatic kerning pairs option. Character spacing will be set automatically if the program you're using offers automatic kerning. However, Flourish's auto kerning doesn't work with every application — automatic kerning works well in PageMaker 2.0 and FreeHand, but not at all in Ready, Set, Go! 4.0. When you can't get the computer to do the work for you, you can manually control the fit of the letters using the Thin Space feature.

Flowers can be added to your flourishes with another Sutcliffe design — a lovely set of wildflower initials included on the Abelard & Troubador disk. The initial letters are based on California native wildflowers. Capitals for these fonts were drawn from a 16th-century manuscript.

Both Abelard & Troubador and Flourish output to any PostScript printer and are available at $79.95 each. Contact The Electric Typographer at 2216 Cliff Drive, Santa Barbara, CA 93109; (805) 966-7563.

— Laura Johnson

One Step at a Time

If you're the type who'd prefer dangling a foot in the pool to test the water as opposed to diving in head first, then Dynamic Graphics has the product for you. Through their "Step-By-Step" videos, you can try your hand at desktop publishing at your own pace. In the same amount of time that you would spend watching "Wheel of Fortune," you can learn about the principles of good design and typesetting. Not only that, but you'll also get a general overview of the hardware and software. Even better, you'll walk through the basic procedures for creating three graphics projects on the Mac. This half hour is well worth missing out on buying a few vowels.

"Desktop Design: 1" is one of three newly released videos in a how-to series on graphic art subjects. Others currently available include "Paste-Up: 1," which guides the user through the procedures of preparing camera-ready mechanicals, and "Calligraphy: 1," an introduction to the basic techniques and tools of the art. Each video sells for $49.95. For more information, contact Dynamic Graphics at 6000 N. Forest Park Drive, Peoria, IL 61614-3592; (309) 688-8800.

— Kristi Coale



What can you do in 30 minutes? Learn the basics of desktop publishing, pasteup, or calligraphy with Step-by-Step videos from Dynamic Graphics.

UPDATES

It's amazing how much action you can miss just by blinking, for example, the whole Tyson-Spinks fight. The same could be said of updates in Mac software. Admittedly, it's hard to keep up with all the new versions coming out, but it is important — it allows you to get the most out of your software. For those in the dark, here's a list of the most recent versions (as of press time) of many popular programs.

To see if you have the most current versions, check the About . . . item at the top of the Apple menu whenever you run a program.

In the realm of Apple System software, owners of 128K Macs should have System 2.0 and Finder 5.1.

For those with the 512K, 512KE, or XL, you should be running System 3.2 and Finder 5.3. Everyone else should be running System 6.0.1, which should be out by the time this hits the stands.

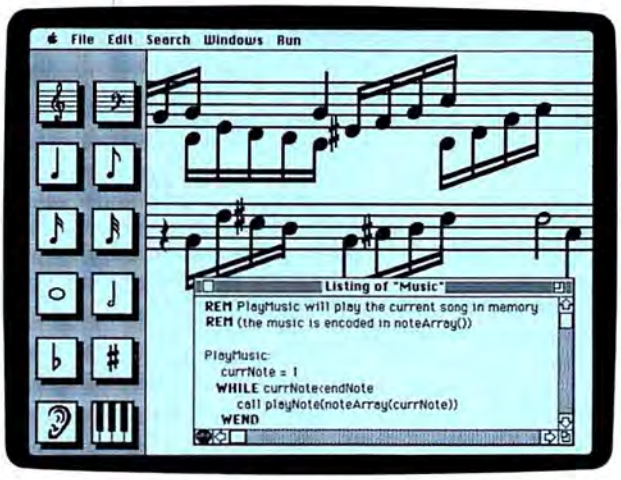
There's MORE (II) where presentation packages come from as Symantec's update to its presentation package boasts word processing and full drawing capabilities. In the midst of the System shuffle, Apple has managed to put out HyperCard 1.2.1. All's well that Findswell — 2.0, at least. Version 2.0 of this document locater adds a new button to open and save dialog boxes.

All programs listed here are HFS compatible. From this chart, you can extract the following information: CP or NCP, copy protected or not; //, programs we've found to be Mac II compatible (not yet a comprehensive list); and S, for shareware (try before you buy).

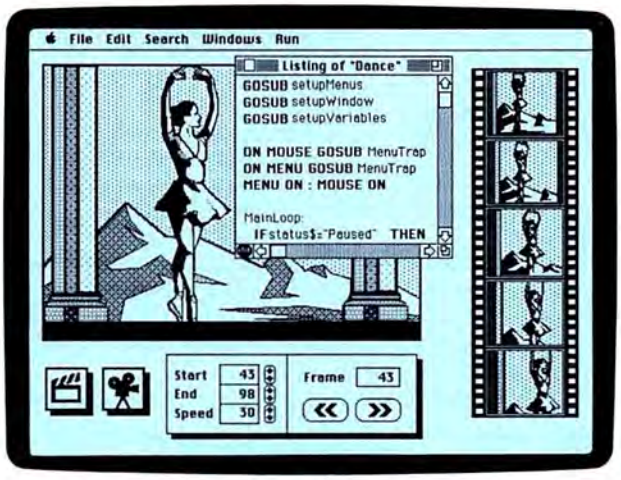
Changes and new listings are in **bold.** Programs that appear to be compatible with the Mac II may not actually perform 100 percent of the functions they do on other Macs, nor do they necessarily take full advantage of the Macintosh II.

A.A.I.S. Prolog	M1.15	NCP	Flight Simulator	1.0	CP	MacMovies	1.02	NCP	QuickWord	2.0	NCP,//
Acta	2.0	NCP,//	Fokker Triplane	1.0	CP	MacNosy V2	2.8	NCP	Rags to Riches	3.0	CP,//
AMS General Ledger	2.08	NCP	FONTastic Plus	1.4	NCP,//	MacPaint	2.0	NCP,//	Ragtime	2.01	NCP,//
AppleShare	1.1	NCP	Font/DA Mover	3.8	NCP	MacPalette	1.0	CP	Read-It!	1.1	NCP,//
Accountant, Inc.	2.1	NCP,//	Fontographer	2.3	CP	MacPascal	2.1	CP	Ready, Set, Go!	4.0a	NCP,//
Aztec C	3.4b	NCP,//	Forecast	2.0	NCP,//	MacProject II	1.0	NCP,//	Record Holder	2.1	NCP
Backgrounder	1.2	NCP	Frame Mac	1.1	NCP,//	MacProof	3.0	NCP	REdit	1.2	NCP
Back to Basics	1.03	NCP	FreeTerm	2.0	NCP,//	MacSafe	1.08	NCP,//	Red Ryder	10.3	NCP
Balance of Power	1.03	CP	FullPaint	1.0	NCP	MacSchedule	1.0	NCP,//	Reflex Plus	1.01	NCP,//
Bulk Mailer	3.0	NCP,//	FullWrite Professional	1.0	NCP,//	MacScheme+			Reports	1.2	NCP,//
Business Filevision	1.1	NCP	Gato	1.42	CP	Toolsmith	1.51	NCP,//	ResEdit	1.1b7	NCP,//
CalendarMaker	3.0	NCP,//	General	3.3	NCP	MacServe	2.3	CP,//	Sargon III	1.0	CP
Capture	1.1	NCP,//	GeoQuery	1.01	NCP,//	MacSpec	1.3	CP	Scoop	1.01	NCP,//
Chart	1.02	NCP	Glue	1.04	NCP	MacSpin	1.1	CP	Scrapbook	174K	NCP,//
Chooser	3.3	NCP	GraphicWorks	1.13	NCP	MacSpool	2.2	NCP	SideKick	2.0	NCP
ClickArt Effects	1.01	NCP,//	**Handwriting Analyst**	1.2	NCP,//	MacTerminal	2.2	NCP	Silicon Press	1.1	NCP
Clipper	1.01	NCP	Hard Disk 20	1.1	NCP	MacTools (MFS/HFS)	7.1	NCP	Slide Show Magician	1.3	CP
CloseView	1.0	NCP	Hard Disk Utility	2.0	NCP	MacWrite	5.0	NCP,//	Smartcom II	3.0A	NCP,//
Cognate	1.5	NCP,//	HD Backup	1.1	NCP	Mac Zap	5.0	NCP,//	SmartScrap & The		
ColorChart	1.3	NCP	HD SC Setup Apple	2.0	NCP	MailManager	1.0	CP	Clipper	1.03	NCP,//
Colorizer	1.1	NCP,//	HFS Backup	1.1	NCP	Map	1.1	NCP	Sound	3.3	NCP,//
ColorMate	2.1	NCP	HFS Locator Plus	2.0	NCP	MapMaker	3.0	NCP,//	SoundCap	4.4	CP
ColorPrint	2.03	NCP	**HyperCard**	1.2.1	NCP,//	MDA	2.0	NCP,//	Space Edit	2.0	CP,//
Comic Strip Factory	1.6	NCP,//	Illustrator	1.0	CP/NCP,//	MDS	2.0	NCP	SpellNow	1.0	NCP
Comic Works	1.0	NCP,//	ImageWriter	2.7	NCP	Measure Test	12.7	CP,S,//	Spellswell	2.0f	NCP,//
Comment	2.0	NCP,//	ImageWriter, AppleTalk	2.7	NCP	MenuFonts 2	2.0	NCP,//	Startup Device	3.3	NCP,//
ConcertWare+	4.0	NCP,//	InBox	2.22	NCP	Megamax C	3.0	NCP	StatView 512+	1.1	NCP
ConcertWare+MIDI	4.0	NCP,//	Insight Expert			**MGMStation**	2.0	NCP,//	StatWorks	1.2	NCP,//
Control Panel	3.3	NCP	Accounting	2.01	NCP,//	MicroPhone	1.1	NCP,//	Stella	1.3	CP,//
Copy II Mac	7.1	NCP	Installer	2.6	NCP	Micro Planner Plus	5.8b	NCP	Stepping Out	2.0	NCP,//
Copy II HD	7.1	NCP	inTalk	3.0	NCP,//	**MindWrite**	2.0	NCP,//	Straight Talk	2.08	NCP,//
Cricket Draw	1.1	NCP,//	Jam Session	1.1	CP,//	miniWriter	1.4	NCP,S	Studio Session	1.4	CP
Cricket Graph	1.2	NCP	Jazz	1A	CP	MockPackage+	4.3.4	NCP,S	Suitcase	1.2.1	NCP,//
Curator	1.04	NCP,//	JustText	1.1	NCP	**MORE**	II	NCP,//	SuperGlue	1.03	NCP,//
DA Handler	6.0	NCP	Keyboard	3.3	NCP	Mouse	3.3	NCP	SuperPaint	1.00	NCP,//
Deluxe Music Con-			Key Layout	2.3	NCP,//	MPW	2.0b	NCP	Switcher	5.1	NCP
struction Set	2.0	CP	Laser Author	1.3	NCP,//	MS BASIC	3.0	NCP	System (MFS-128K)	2.0	NCP
Design/IDEF	1.1	NCP,//	Laser Prep	5.2	NCP	MS BASIC Compiler	1.0	NCP	System (HFS)	6.0	NCP
DesignScope	1.14	NCP,//	LaserShare	1.0	NCP	MS Fortran	2.2	NCP	Telescape	1.0	NCP,//
DeskLink	2.0	NCP,//	LaserSpeed	1.6	NCP,//	MS Works	1.1	NCP,//	Telescape Pro VT 100	1.1	NCP
Disk Express	1.10	NCP	LaserStatus	2.0	NCP	MultiFinder	6.0	NCP,//	Tempo	1.2	NCP
Disk First Aid	1.4	NCP	LaserWriter	5.2	NCP	Multiplan	1.11	NCP,//	Textures	1/01	NCP,//
DiskFit	1.4	NCP,//	Laser Writer IISC	1.1	NCP	MusicWorks	1.1	CP	Think 'n Time	1.1	NCP,//
DiskInfo	1.45	NCP,S	Layout	1.3	NCP,S	myDiskLabeler	2.11	NCP,//	ThinkTank	2.0	NCP,//
Disk Ranger	3.1	NCP	Legal Billing	1.72	NCP,//	'Ncryptor	2.0	NCP,//	Thunder!	1.0.1	NCP
Disk Tools Plus	1.01	NCP,//	Legal Billing II	2.39	NCP,//	Neon	2.0	NCP	Thunderscan	4.0	NCP
DiskTop	3.0.2	NCP,//	LightSpeedC	3.0	NCP,//	NightWatch	1.02	NCP,//	TML Pascal	2.01	NCP
Dollars & Sense	4.0	NCP,//	LightSpeed Pascal	2.0	NCP,//	Omnis III Plus	3.25	NCP,//	TMON	2.8	NCP
Double Helix II	r40	NCP,//	Listen 2.0	2.1	CP,//	OverVUE	2.1e	NCP,//	Top Desk	3.0	CP
"Draw it Again, Sam"	2.04	NCP,//	Lode Runner	1.0	CP	PackIt III	1.3	NCP,S	TOPS	2.0	NCP,//
Easy Access	1.0	NCP	Lookup	1.0c	NCP,//	PageMaker	3.0	NCP,//	**Trapeze**	2.1	NCP,//
Easy3D	1.01	NCP	Mac3D	2.1	NCP,//	Parameter Manager	1.092	NCP	Turbo Download	2.1	NCP,//
Edit	2.1	NCP	MacASM	1.2	NCP	Performer	2.31	CP	Turbo Maccountant	2.0	NCP,//
Excel	1.5	NCP,//	MacBillboard	4.01	NCP,S	PictureBase	1.2	NCP	Turbo Pascal	1.1	NCP,//
ExperCommon Lisp	2.2	NCP	Mac C	5.0	NCP,//	Plains and Simple	4.1	NCP,//	Type Now	1.0	NCP,//
ExperLisp	1.5	NCP,//	MacCalc	1.2	NCP	PLP	2.0	NCP,//	VersaTerm	3.0	NCP
ExperLogo	1.1	NCP	Mac Daisy Link	1.04	NCP,//	PowerPoint	2.0	NCP,//	VersaTerm Pro	2.0	NCP
Expressionist	2.0	NCP,//	Mac Disk Catalog II	2.1C	NCP	PowerStation	2.3	NCP,//	VideoWorks II	2.0	NCP,//
EZ Draft	2.0	NCP,//	MacDraw II	1.0	NCP,//	Print Monitor	1.2	NCP,//	VIP	2.5	NCP,//
FastBack	1.02	NCP,//	MacDraft	1.2b	NCP,//	Professional Composer	2.1	CP	Widgets	3.0	NCP
File	2.0	NCP,//	MacFlow	2.03	NCP,//	Profit Stalker II	1.3	NCP	Word	3.02	NCP,//
Filemaker Plus	2.1	NCP,//	MacFortran (all)	2.3	NCP,//	Programmer's Online			Write	1.0	NCP,//
Finder (MFS-128K)	4.1	NCP	MacGolf	3.0	CP,//	Companion	2.0	NCP,//	WriteNow	1.07	NCP,//
Finder (HFS)	6.1	NCP	MacInTalk	1.1	NCP	Project Billing	3.0	NCP,//	XPress	1.1	CP/NCP,//
Findswell	2.0	NCP,//	MacLabeler	2.2	CP	QUED/M	2.04	NCP	ZBasic	4.0	NCP
FlashBack	1.6	NCP	MacMoney	3.01	NCP,//	QuicKeys	1.1	NCP,//			

Teach your Mac to perform unnatural acts.



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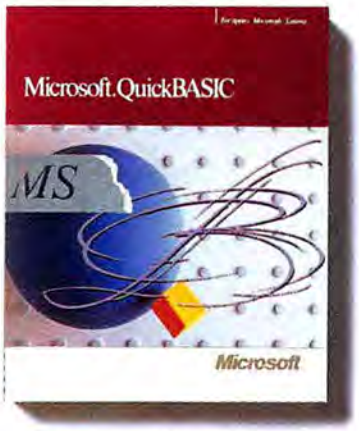


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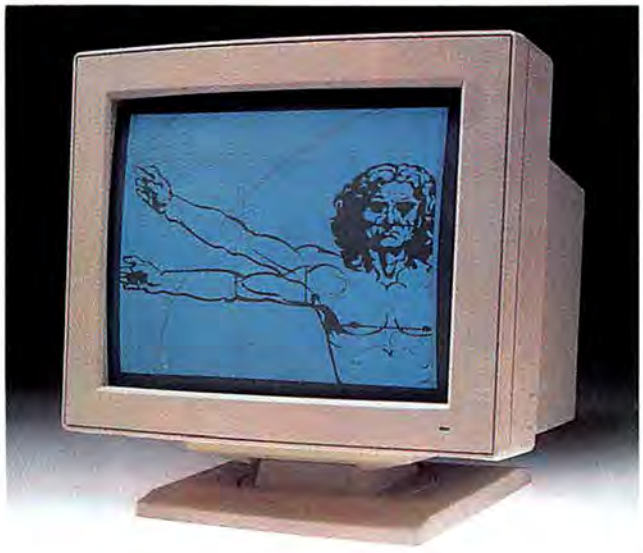
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The Nutmeg 19, along with the Nutmeg/Xerox Full-Page Display, are the first monitors on the market that have adapter cards for different Mac models.

Double Vision

You can stop rubbing your eyes — you are in fact seeing double! It's Nutmeg Systems' dual-page display for the Mac, the Nutmeg 19. See twice what you used to see in CAD, desktop-publishing, graphics, and imaging applications with this low-priced monitor ($1,699 for the Plus and SE; $1,899 for the Mac II). Each monitor comes with a video kit that includes a video module, cabling, software, and an adapter board for the model of Mac specified.

Unlike other monitors' video kits, the module that comes with the Nutmeg system can be used in any model from the 512 to the Mac II. This comes in handy when you want to upgrade. To make the monitor run with your new Mac, you just purchase the appropriate adapter board ($325).

Also taking advantage of this "proprietary video interface" is the Nutmeg/Xerox Full Page Display monitor. This high-resolution monitor (90 dpi in a 720 X 960-pixel display) lets you view an entire 8 ½ X 11-inch page on-screen. Like the Nutmeg 19, the Nutmeg/Xerox FPD package includes a video kit that comes with the interchangeable module — you have to purchase the adapter. For the Plus and the SE, the Nutmeg/Xerox FPD sells for $1,599; $1,799 for the Mac II. Contact Nutmeg Systems for more information at 25 South Avenue, New Canaan, CN 06840; (203) 966-3226.

— Kristi Coale

Hard-Core Code Bashing

What happens when you cram nearly 200 Mac hackers together? If the recent MacHack '88, held in Ann Arbor, MI is any indication, sparks fly, lots of information is exchanged, Apple gets a lot of advice (both pro and con), and beds go largely unslept in.

The programmers and developers came from all over the United States and from several European countries. And while there was a complete formal program of speakers, presentations, and "events," the real reason to go to a Holiday Inn on the west side of steaming Ann Arbor was the informal meetings and chats that went on night and day.

Apple was represented by no fewer than a dozen engineers, digital scribes, and programmers. That's 11 more than attended last year. One of the highlights of this year's gathering occurred the first night, when the Apple folks faced the rest of us for a good, solid Apple-bashing session. Lots of tough questions were asked and lots answered (some, of course, with the infamous, "We don't comment on unannounced products.") The session, scheduled for two hours, went on nearly twice that long.

The conference started with a keynote address delivered by Ted Nelson of Project Xanadu fame. Nelson was allotted an hour, but spoke for several hours, and his talk was interrupted by a lunch break. (Running over schedule is not so much a tradition as a rule at programmers' gatherings.)

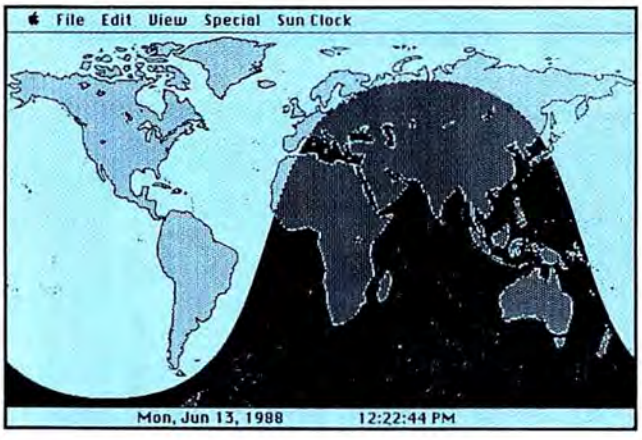
We looked at the new TML Pascal II and THINK's Light-SpeedC version 3.0 and lots of new debugging tools, including Steve Jasik's latest enhancements to the MacNosy package. Lots of programmers demonstrated their work (usually work in progress), and Apple's engineers were particularly interested.

— Steven Bobker

Night and DA

The sun never sets on the desktop empire, thanks to a new desk accessory from MLT Software. Once installed, Sun Clock checks the time and displays a global map showing where the sun don't (and do) shine. The display is continuously updated as time goes by. You can get a global sun-coverage snapshot for any other time, so jet-setters stalking the perfect tan can plan their itineraries accordingly. You can also click anywhere on the map to find the local time at that location. A miniature version of the map can be displayed while running other applications. Sun Clock lists for $17 and is available from MLT Software at P.O. Box 98041, 6325 SW Capitol Highway, Portland, OR 97201; (503) 245-7093.

— Jon Zilber



Seeing where the sun do (and don't) shine. The Sun Clock desk accessory, from MLT Software, lets you see the difference between night and day.

Presentation Pitch

Aldus and Software Publishing have announced two new products for the already crowded desktop presentation market. Aldus, of PageMaker fame, hopes to repeat its success with a new package called Persuasion. Software Publishing, which already has a presentation package for IBM PCs, is developing a program that will carry its Harvard brand name. Aldus' Persuasion is slated for release in late 1988; SPC's Harvard program won't be available until sometime in 1989.

Aldus' new Persuasion is targeted at managers and salespeople, as opposed to the art directors who traditionally design presentations. It integrates slide and transparency composition with outlining and charting tools. To help managers over the rough spots of slide design, Aldus includes AutoTemplates, which allow you to dump an outline into a predefined slide format.

Other Persuasion features include a slide-show feature for viewing presentations on-screen; the ability to import Excel, Word, and Encapsulated PostScript files as well as other formats; a spelling checker; and full color support, including graduated fills, on the Mac II. At press time, Aldus was still exploring a joint agreement with a national slide service to provide next-day turnaround on developing slides. (Both PowerPoint and Cricket Presents already carry such options.) Persuasion is expected to sell for $495.

SPC's Harvard product is still under wraps but promises to be very much like Harvard Graphics, their presentation system for IBM PCs that supports a wide variety of slide-making devices. It will definitely have a three-dimensional charting and graphing capability, and it's likely that there will be transparent file transfers between their PC product and the Macintosh offering.

The two new products will join at least four other packages (PowerPoint; ReadySetShow, Cricket Presents, and MORE) that are vying for supremacy in the desktop-presentation market.

— Ben Templin



Aldus does it too. Persuasion, Aldus' new presentation package, is aimed at managers and salespeople, instead of art directors. It combines slide/transparency composition with outlining and charting tools.

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by Neil L. Shapiro

News from Outer Space

Take it from me: Hospitals are no fun at all. I just spent two weeks in one of Long Island's finest having my gallbladder yanked out. It appears that once you turn 40 various parts go out of warranty.

However, while I could have missed the experience overall, it did come in handy in one way. For the first time in a few years I began to, once again, suffer from what I call "The Man From Mars Syndrome."

Now, that syndrome is not related to gallstones or to surgical procedures or even to Blue Shield cards. Rather, it was a reminder to me that, in general, computing is still a very new field, and when you talk about only one type of computer you are really starting to get parochial.

The Man From Mars Syndrome first manifested itself when one of my nurses, probably desperate to stop my complaining and whining, asked me what I do for a living. I don't think she expected to be challenged by my answer. She probably figured that I was a schoolteacher or, at worst, sold used cars.

Without thinking much about it, I told her I was a sysop on a national telecommunications network and that I was one of the editors of *MacUser* magazine, which I had founded. Suddenly, I realized that I was speaking in tongues, at least as far as she was concerned.

I might as well have said that I was an Acolyte of the Dark Being and had invented the Spell of Omen for the local witch doctor's convention. Her confusion was evident.

I explained as best I could. I told her that on a computer network many people with home computers can type at one another and leave messages, exchange software, and entertain each other. I told her that I was sort of like David Letterman, but on my talk



JENNY ADAMS

show, everyone was typing instead of talking. And I told her that many Macintosh owners knew about *MacUser* magazine.

I think she put on my chart that I was a difficult patient.

Throughout my stay in the hospital, this kind of scenario would repeat itself. I kept glancing at my electronic watch, for once thankful it showed the year. Yes, it was indeed 1988. I hadn't felt like this since 1978 back when I was the only person I knew with an Apple II computer.

During the course of my stay there, I would meet medical personnel as well as visitors to other patients and just general people. In every case, I had basically the same Man From Mars conversation.

They would ask what I do for a living, and I would tell them. And they would have no idea what I was talking about.

Wow.

Now some of these people used microcomputers in their offices. It wasn't that they didn't know what a computer was. At least, they *thought* they knew what a computer was.

But to these people a computer is just something that you run a spreadsheet or a database on — by rote or using learned commands/incantations — or it's the mysterious thing that school budgets need approval to buy so our children are not taken over by the Russians.

I realized two important things while I was in the hospital. First, I never want to be sick in the hospital again. Second, this is not really the Golden Age of Computing. What we are in now is the Stone Age of Computing — well, maybe the Bronze Age.

Most people still have no conception either of what a computer is or of all the ways that they might be able to use one in their own personal lives.

Hey, people! Fire is good. Fire is your friend. Fire can cook your meat and keep you warm.

It's amazing, to me anyway, that so few people in the "real world" have any conception of the things that you and I take for granted. And, you know something? I think it will get worse before it gets better.

TRIBES AND TRIBULATIONS

The trouble is that the computing community is now so large that it is beyond the "one tribe" size. We've already fragmented our society into microcosmic, warring factions.

We have the Macintosh Tribe (a vocal subset of the Apple Nation), the IBM Warriors, the Commodore Battalions, the Amiga Buddies, and the ST Troopers. We have so many different subsets that we can no longer see the dark forest for the few brightly lit trees.

You and I have spent a lot of time going over reasons why the Macintosh

> You don't have to recommend a Macintosh every time. If you know a person with a limited income and four kids, what's wrong with recommending a Commodore 64?

is the best computer. You know something? We have been guilty of parochialism in the worst sense.

Once in a while, let's leave aside the question of which computer is "best" or what CPU has the most software or even which platform one should choose. Instead, let's just tell people about computing.

A lot of people out there really don't know that their lives are incomplete, that they are missing out on one of mankind's greatest and most powerful steps forward. Let's tell them about it. Today.

All of us must know some acquaintance or business associate who either does not know about computing or thinks a computer is a piece of glass with a spreadsheet behind it. Let's wake these people up.

Get them into computing.

And it doesn't mean you have to recommend a Macintosh every time. If you know a person with a limited income and four kids, what's wrong with recommending a trip to Toys 'R' Us and a Commodore 64?

Stop being parochial.

The important thing to get across to people is that computing is here, that computing can be helpful in ways they never imagined, and that computing is not difficult to enter into.

We have to stop sitting back and being satisfied that, yes, we have arrived. *MacUser*'s circulation is in the hundreds of thousands. Great. When I worked for *Popular Mechanics* magazine, that journal sold more than six million copies every month.

Help our circulation manager reach six million! Start telling people about computing as if they had never heard of it before — because maybe they really have not.

This may be 1988 for us. It's still 1978 for them.

THE BLUE PENCIL HAVING WRIT. . . .

Well, everybody gets edited sooner or later. I received some angry E-mail from a Xerox employee in response to July's column. That column contained these words:

"No one really knows what agreement existed between Apple and Xerox PARC that developed into an ancestral, albeit crippled and half-formed, version of the Mac on the Xerox STAR computer."

This fellow, who had worked on the STAR, rightfully felt that I was somehow saying the STAR owed something to the Mac.

The copy as I had written it was: "No one, for example, really knows what agreements existed between Apple and Xerox PARC which, on the Xerox STAR computer, developed an ancestral, albeit terribly crippled and half-formed, version of the Mac."

Whatever. The point I was trying to make was that the STAR computer is definitely an ancestor of the Macintosh computer and that the Macintosh owes a great deal to the work of the Xerox PARC people.

In point of fact, the Macintosh might never have existed if it were not for the STAR. Steve Jobs saw the STAR, and Apple purchased various rights to its operating system from Xerox. What these rights were I do not know. But it's obvious that the STAR was the first mass-produced microcomputer to have such things as pull-down menus, windows, and icons as its built-in operating system.

I'd like to apologize to STAR people who might have thought I was somehow saying that the STAR owed a debt to the Macintosh. It is really the other way around.

> Vision. That's the difference between success and limiting yourself. The two Steves had the vision.

As far as the pejorative words *half-formed* and *crippled*, I would like to clarify them as well. By *half-formed*, I only meant in relation to where the Macintosh would later take things.

Crippled I stand by. But, by crippled I do not mean crippled in execution but crippled by a series of extremely poor marketing decisions divorced from the developmental effort.

The Xerox STAR was sold at upwards of ten thousand dollars. To say that it was overpriced for the time is hardly to do justice to the stupidity of such a price point. If ever a worthy computer was sold down the river by a decision to see that it was never really sold — the Xerox STAR is the prime example.

The programmers and developers of the Xerox STAR should feel always exceedingly proud of their vision and their accomplishment. On the other hand, the people who marketed the Xerox STAR should never be allowed to sell anything again.

Isn't it odd how things turn out? Back in Apple II days, Steve Wozniak put together the first Apple I with parts from his job at Hewlett-Packard. And, H-P told him to go ahead and keep the idea. Then, in the debut days of the Macintosh, Steve Jobs picked up an idea from Xerox that they had no idea what to do with.

Vision. That's the difference between success and limiting yourself. The two Steves had the vision.

And, thanks to them, we have the computers.

See you next month, I have to go get some stitches removed. . . .

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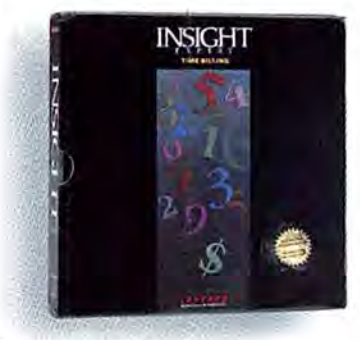


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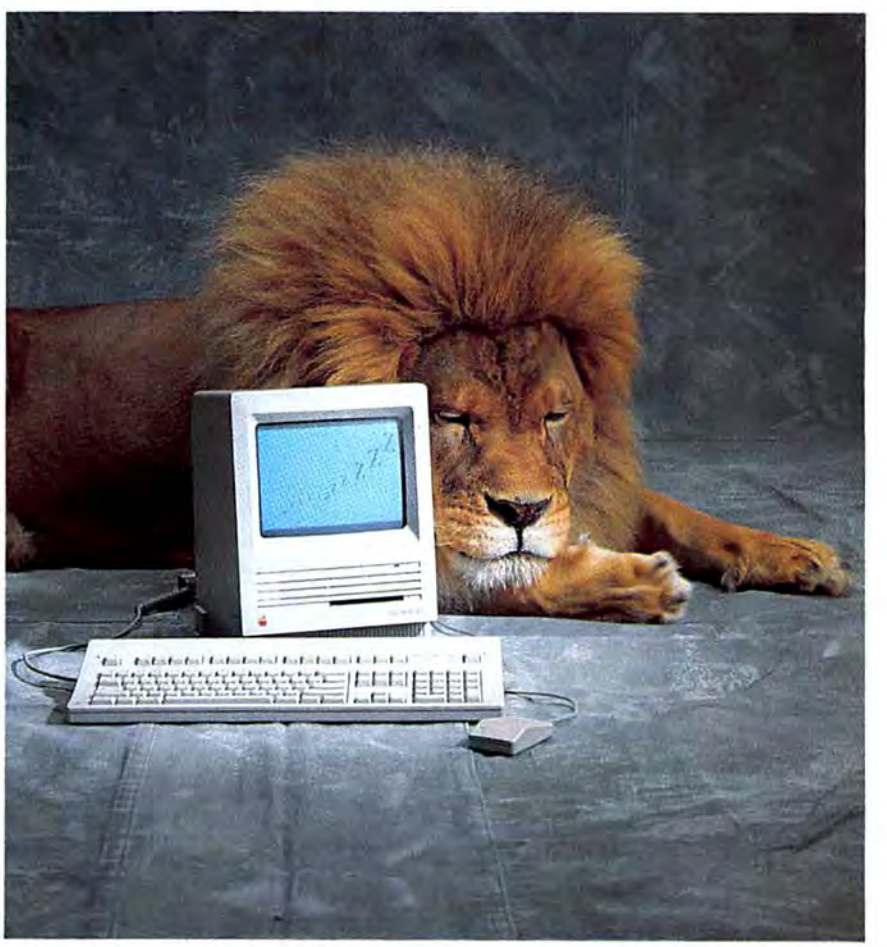
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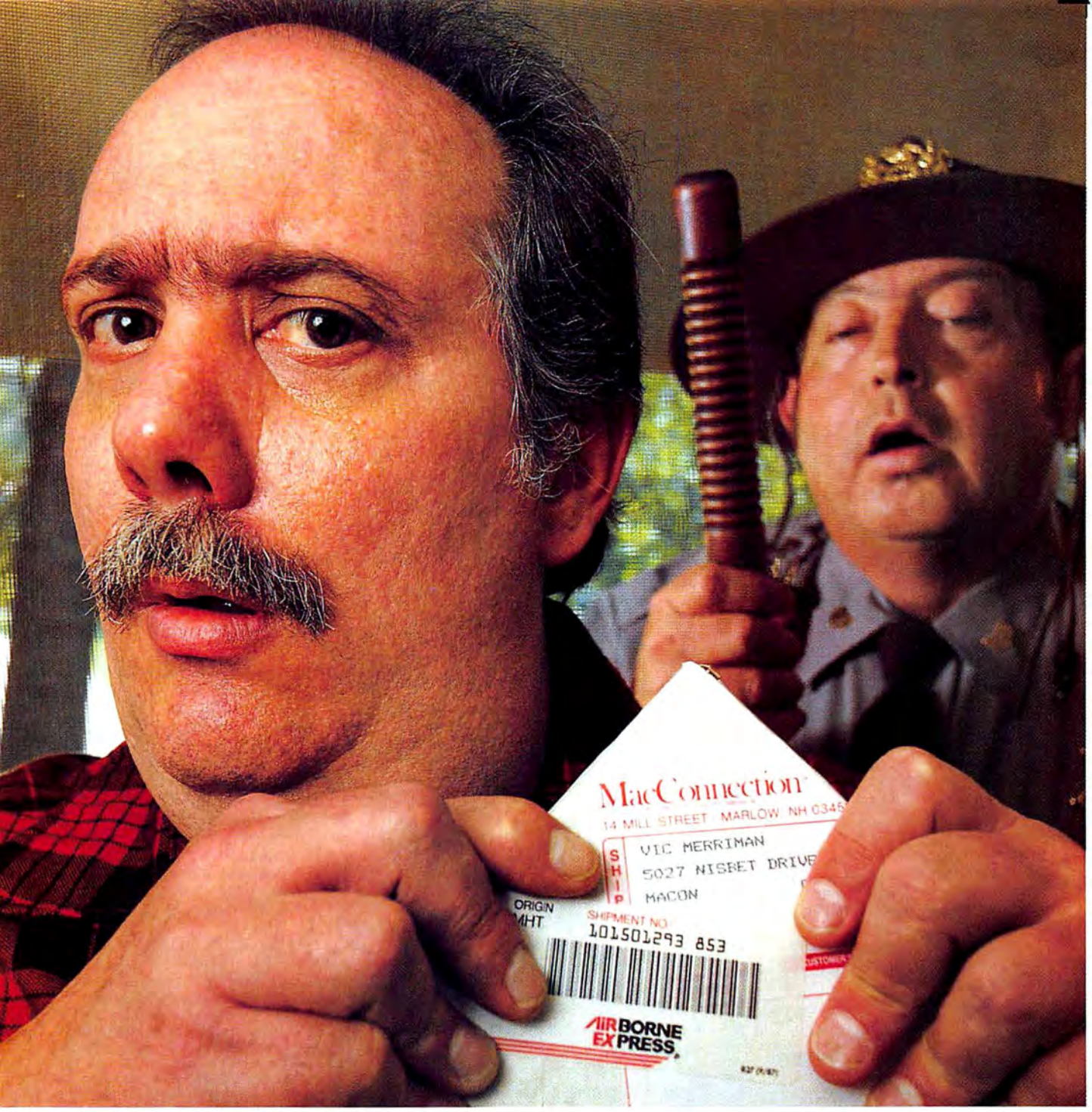


BY ROBERT R. WIGGINS

It's not exactly a secret. On the other hand, it's not exactly general knowledge. Apple Computer, the David to IBM's Goliath, is widely known to have a Cray supercomputer. What is not so widely known is that Apple also has IBM mainframes. When it needed mainframe commercial data processing hardware, Apple wanted the best, and IBM was it. The result is that in the core of Apple are a bunch of IBM mainframe support people.

This isn't really bad. In fact, if you have mainframes of your own, it's actually quite good. You see, these mainframe people inside Apple got frustrated that they had to make their powerful, intelligent Macintoshes act like wimpy, dumb terminals in order to tie them into their mainframes. Since they were inside Apple, they had access to the resources they needed to do something about it. So they cobbled together some software that would let them use their Macintoshes as intelligent workstations for their mainframes.

That was good for them; it also ends up being good for all mainframe users, because other groups inside Apple saw that there was a potential market out



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in the real world for a product like this. There are a lot of people who feel the same frustrations at making their powerful Macintoshes play dumb to talk to mainframes. So Apple took this workstation software, worked with it, improved it, and debugged it, and the result is MacWorkStation. Apple is letting everyone know that MacWorkStation isn't brand-new by numbering this first public release as version 3.0.

THE FRONT END

The idea of putting some intelligence at the front end is not new. IBM did it with their PC3270, using a combination of hardware and software. It's been done on the Macintosh, too, with programs such as Front End from Kaz Business Systems and Navigator from CompuServe. Most front ends have been limited by the fact that the mainframe end didn't know it was talking to an intelligent terminal and therefore couldn't take full advantage of the intelligence at the front end. MacWorkStation is designed to integrate host applications and the Macintosh to produce true cooperative applications.

You're probably thinking that, if the host end has to know that MacWorkStation is at the other end, then you would have to modify existing applications or write new ones, so what's the big deal? The big deal is that MacWorkStation lets you quickly and easily build the Macintosh end of a cooperative application without the extensive work and detailed knowledge of the Macintosh normally required to develop a Macintosh application. Usually, the modifications to existing mainframe programs need be made only at the terminal-handling level, which in many cases is in a separate module outside of the main program anyway.

THE CENTER

What makes MacWorkStation so powerful is its modular design (see Figure 1). At its heart is the Main Module, which handles the message traffic in both directions and determines what other modules need to be involved. Above the Main Module are the Director Suites containing the various Directors. Directors act as a high-level toolbox of routines that can be called upon to perform the functions required to maintain the Macintosh interface.

The Presentation Directors handle displaying alerts and dialog boxes, windows, graphics, the cursor, menus, and lists. The File Directors handle creating, opening, and saving files, as well as printing. Graphics images can be saved as PICT files, which MacDraw and most other graphics programs (except MacPaint) can read. Text information is saved as text.

These Directors make it possible to build an application that can create files, display data, and even print without doing any real programming. If you happen to have Macintosh programming expertise, you can create your own Exec Directors using any high-level Macintosh programming language and then use your Exec Directors in your application. These Exec Modules can also use the facilities of the other Directors, so even this level of programming doesn't necessarily require the level of skill that normal Macintosh programming does.

THE BASE

MacWorkStation is built above several Communications Modules. The modular approach at the base helps make MacWorkStation device- and network-independent. The currently available modules are TTY, for simple ASCII terminal emulation; ADSP, for communicating via AppleTalk; 3270, for IBM 3270 emulation using AppleLine; and OSI. Additional communications modules are expected from Apple and from third-party developers.

MacWorkStation also includes a powerful scripting language, the Communications Connection Language (CCL). CCL scripts can be very complex and can handle all of the work necessary to establish the connection with the mainframe application. Once CCL gets the session established, it passes control to the appropriate Communications Module.

CREATING APPLICATIONS

You can create two kinds of applications with MacWorkStation: generic applications and tightly coupled appli-

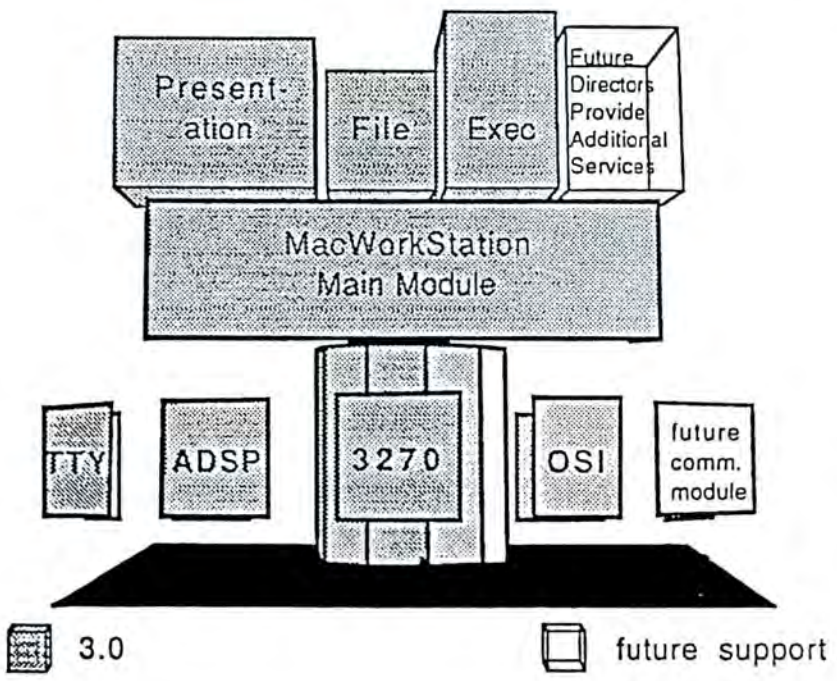


Figure 1: MacWorkStation was made of a set of building blocks. This modular approach allows you to customize at both the low-level communications end and the high-level director end.

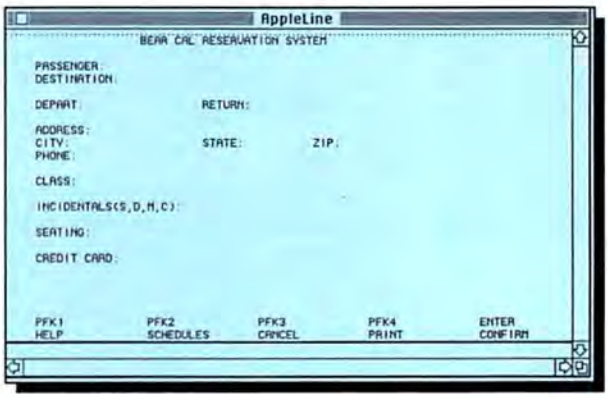


Figure 2: A simple application, the Bear Cal airline reservation system, as it might look in MacTerminal 3270 emulation using AppleLine.

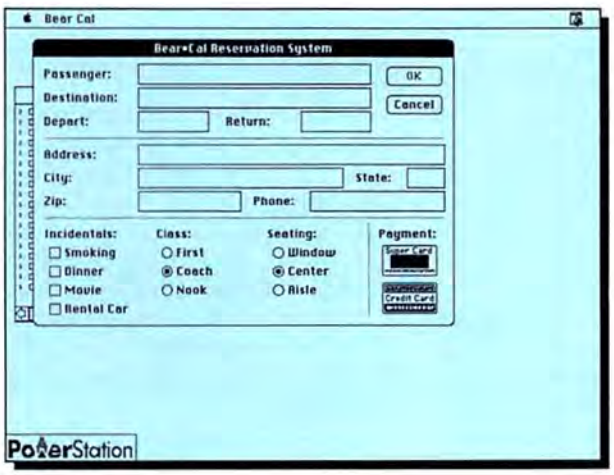


Figure 3: The same application, but implemented with MacWorkStation to take advantage of the Macintosh interface. (This is one of the sample applications provided with MacWorkStation.)



Figure 4: The commands sent from the host to create the Bear Cal dialog box, captured using the TestHost program's traffic-monitoring capability.

cations. The simplest is the generic application, which gets all data from the host. More than likely, the best applications for MacWorkStation already exist, except they're meant to talk to dumb terminals. These are candidates for generic MacWorkStation applications. These mainframe applications send data to the screen of the terminal and process the input that comes back from the terminal. By programming a Terminal Interface Module (TIM) on the mainframe, it is possible to "fool" the application into thinking it's talking to just another terminal. The mainframe application sends and receives the same data streams it always did. The TIM adds the MacWorkStation commands on the way out and strips them off on the way in.

Figure 2 shows an example application as it would appear on a Mac using MacTerminal and AppleLine for 3270 emulation. Figure 3 shows the same example as it could be implemented using MacWorkStation. Notice how mutually exclusive choices can be shown with radio buttons, and how Program Function keys can be replaced with buttons or with pulldown menu items.

The programming effort for a generic MacWorkStation application is completely in the TIM, or in the host application if a separate TIM isn't possible. Figure 4 shows the data stream sent to MacWorkStation to create the dialog box shown in Figure 3. The TIM would construct this data stream.

The more advanced form of MacWorkStation application is the tightly coupled application. In a generic application, the host handles all events. In a tightly coupled application, the host application and the MacWorkStation application interact less because the MacWorkStation application has more intelligence and handles some events locally, only bothering the host when necessary. This makes for more powerful applications that perform better. Tightly coupled applications require coding at the Macintosh end as well as at the host end, and they require a higher level of expertise to implement.

TESTING APPLICATIONS

MacWorkStation comes with a program called TestHost that lets you see what MacWorkStation applications are up to. You can also send commands and scripts to an application to make sure it is responding properly. By using AppleTalk and MultiFinder, it is even possible to run the MacWorkStation application and TestHost on a single Macintosh. Figure 4 shows the TestHost program monitoring traffic.

EXPENSIVE BUT VALUABLE

MacWorkStation is not cheap. A license to use it for internal development within a company is $2,500. If you

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want to sell any applications you produce, the license is $5,000. You get value for your money, though, and the price is certainly reasonable when compared to mainframe software prices. The programmer time that can be saved on the Macintosh end on just one simple application could cover the license cost.

WHAT'S A MAINFRAME?

The MacWorkStation end of one of these cooperative applications is always a Macintosh. What can be at the other end? The obvious answer is a mainframe. With its 3270 driver, MacWorkStation is a natural for connecting to IBM mainframes. A major bank in New York is developing a CICS-based mainframe application to talk to MacWorkStation. With its TTY driver, MacWorkStation can also be used with any ASCII-based mainframe or minicomputer, such as DEC and Data General systems.

But it doesn't stop at mainframes. With its AppleTalk driver, MacWorkStation can talk to any system you can connect via AppleTalk. So even a Macintosh can be a host to MacWorkStation (in fact, that's exactly why TestHost works).

PERFORMANCE

Applications created with MacWorkStation can be sluggish at times, especially generic applications. As Figure 4 illustrates, the amount of data that must be transmitted to draw a single dialog box can be substantial. Graphics can require even more data transmission. MacWorkStation must also interpret and act upon each transmitted command, which takes more time.

DOCUMENTATION

MacWorkStation comes with an 86-page Programmer's Guide and a 230-page Programmer's Reference. The Programmer's Guide includes the C source code for the example Bear Cal application (the source also comes in machine-readable form). The Programmer's Reference includes an appendix describing the TestHost program. The documentation may seem scanty, but it is more comprehensive than it appears. If you are familiar with the Macintosh, you should be able to get everything you need out of the documentation.

SUPPORT

Apple has never been known for its product support, but since MacWorkStation isn't a consumer product, the support is much better than usual. Apple's developer services organization is supporting MacWorkStation. Apple direct accounts and MIS developers can get additional support from Apple's Technical Communications support group.

BOTTOM LINE

MacWorkStation is obviously not a casual application. It is a development environment and a sophisticated communications program wrapped up in a single package. It is not for everyone. But if you're one of those people who get really annoyed that your company's Macintoshes have to play dumb to access your mainframe data, MacWorkStation is just what you've been looking for.

ROBERT R. WIGGINS USED TO BE MACUSER'S CONTRIBUTING BUSINESS EDITOR UNTIL IT WAS DECIDED THAT HIS TITLE TOOK UP TOO MUCH SPACE ON THE MASTHEAD.

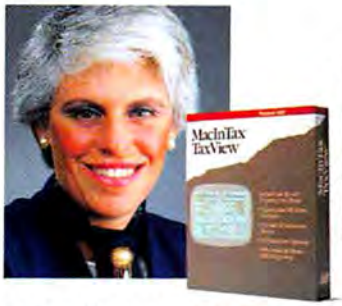
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MacWorkStation 3.0

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Follows Mac Interface	■ ■ ■ ■ ■
Printed Documentation	■ ■ ■ ■ □
On-Screen Help	■ □ □ □ □
Performance	■ ■ ■ ■ □
Support	■ ■ ■ ■ □
Consumer Value	■ ■ ■ ■ □

Comments: Development environment and communications program that allows custom mainframe applications access to the Macintosh interface. **Best Feature:** Modular design, which allows for expandability. **Worst Feature:** The large data streams required can mean poor performance. **List Price:** $2,500 for internal use license, $5,000 for commercial use license. Available from Apple Software Licensing, 20525 Mariani Avenue, Cupertino, CA 95014; (408) 996-1010. Not copy protected. Mac II friendly and MultiFinder friendly.



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by Steven Bobker

HyperCard Redux

HyperCard has now been widely available for a little over a year (actually it's a bit under a year as I write this, but that doesn't change what I'm about to say). A year ago there was a lot of oohing and aahing and some kvetching about HyperCard. It was ballyhooed as the greatest thing since sliced bread — or at least since the first Macintosh. Lots of predictions were made.

Here are some of them: "HyperCard delivers enough magic and tools to start a revolution in information management." HyperTalk would become the programming language of choice for all levels of Mac users. By this time next year (i.e., now), dealers' shelves would be awash with dozens of HyperCard applications. "Many commercial stacks are already on the market or under development." HyperCard would radically change how we look at and manipulate data. Apple would (or would not) continue strong development efforts. Lots of developers and software publishing companies would have to switch to developing and publishing stackware or be driven from the marketplace. Paint programs would be supplanted by HyperCard with its built-in graphics capabilities. Most hypertext/HyperCard implementations have an inherent nastiness about them (that from Dvorak, of course). Everyone will be able to develop applications using HyperTalk. It will destroy the Mac interface (me, of all people). It will hurt the Macintosh. It will help the Macintosh. Neil Shapiro called HyperCard "the world's most exciting computer program, both from a personal viewpoint and from that as an observer of the Macintosh scene."

You can find all of those comments and predictions (and many more) in *MacUser*'s November and December '87 issues. Those were our first issues



DIDIER CREMIEUX

to cover HyperCard. And as you can see, most of the predictions missed; some by a bit, some by a mile.

There's no denying that, at a year old, HyperCard has been a success. It's fairly widely used, and lots of good books explaining and empowering it have been produced and — judging from the rate at which they disappear from the shelves at my local dealer (ComputerWare in Palo Alto) — bought.

But the slew of commercial applications hasn't materialized. Major software publishers are using HyperCard, but not to publish stackware. They're producing help and tutorial files for their existing and new "normal" products, not for HyperCard applications.

Sure, there are some HyperCard applications, but you can count them rather easily — without using your toes. The only three that you're likely to see in a store (at the time we went to press) are Focal Point, Business Class, and City to City. They're all published by Activision (or, as they are now known, Mediagenics). The first two were developed with lots of help from the HyperCard crew at Apple. City to City didn't require that sort of help, since it relies very heavily on the Business Class technology.

There are other applications, and the recent HyperExpo held in San Francisco proved that a lot of people are producing good stacks. In fact, it was there that I found the organizer that I am currently using, Organizer + from Dazzl Software (2 Chandler Court, Columbia, MO 65201; (314) 874-8657).

What are less visible (and so less obvious) but far more important are the other places and disguises where HyperCard is turning up. As noted above, many software publishers are turning to HyperCard for tutorials and help files. HyperCard is a particularly effective medium for presenting learning materials, especially those that accompany the new generation of programs that require more than 1 megabyte of memory. If you have a minimum of 2 megs, then HyperCard's overhead isn't nearly so onerous.

If you're doing anything with CD-ROM for the Macintosh, you're looking at HyperCard for your all-important search engine. Right now, it's the only way to go; it's a real fine way to go. Eventually, HyperCard will be supplanted as the CD-ROM search engine of choice. But for now it does a yeoman's work in that regard and will continue to do so in the near future.

Lots of consultants have also been tailoring custom stacks for their clients. Most of this work is proprietary but of very high quality. In fact, my informal survey indicates that custom stacks for business are the most common usage of HyperCard in the business world.

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A large number of training stacks, tools stacks, and utility stacks are also available. In addition, many of the better XCMDs and XFCNs — the real power tools of HyperCard — are available either electronically or commercially. Among the more significant HyperCard utilities products are HyperPress' recently released Icon Factory and Script Express. They're useful for building your own stacks but have no other functionality.

Bulletin boards, user groups, and on-line services have been overrun with stackware, some of which is also shareware. Some of these stacks are brilliant, but the vast majority simply use HyperCard as a fancy database-type application. The good ones are really neat, combining inventive programming with useful functionality. But most are, at best, cute. Too many are simply flat databases with far more flash than substance. Still, there are enough raw gems out there to make trolling the nets worth it.

One of the main points of the early HyperCard hype was that the program, thanks to HyperTalk, is user-extensible. If you find something that you like a lot but that's just not quite right, fix it. That's certainly proven true. HyperCard programming is covered in a monthly column here (Card Tricks, by Michael Swaine) and in similar columns in other magazines. There are even two fairly slick magazines (*HyperAge* and *HyperLink*) devoted solely to HyperCard, HyperTalk, and HyperCard products.

While the future of HyperCard is assured, there are still some problems. The program still requires at least 1 megabyte of memory. The HyperDA from Symmetry does give 512K owners limited access to the text in stacks, but it becomes less useful every day, as stacks become more complex and rely on features and scripts that HyperDA can't deal with. A limited version of HyperCard with read-only capability would be greatly appreciated.

HyperCard went through many release revisions in its first 10 months on the market. The original versions had a few bugs and couldn't, for example, work with stacks on CD-ROM drives. The newer versions, including the version current at press time (1.2.1), work fine with CD-ROMs and clean up many of the other small problems.

In the fixing and upgrading process, a small amount of downward (or backward, if you will) compatibility has been lost. It's not really Apple's fault,

A limited version of HyperCard, with read-only capability, would be greatly appreciated.

but it's a problem all the same, and it's a problem caused by HyperCard being too good for its own good.

What's happened is that several bugs got to be well known. Patches that you could use as part of your scripts were also developed and generally widely circulated. Now if you run a stack with a script that you've added patches to, you'll be trying to fix things that are no longer broken. That can sometimes lead to problems. In the simplest case, you might wind up fixing something already fixed by the new version, and all that you'll do is waste a tiny bit of time. In more severe cases, the script might no longer run at all, and you'll be faced with some HyperTalk debugging in order to get it going again.

Apple's record of supporting and upgrading HyperCard has been very good. And, starting with version 1.2, they have taken a giant step toward really making HyperCard the System software they always claimed it was. What they did was allow developers and publishers to include the latest version of HyperCard with their packages. There is a license fee, but it's extremely small. Of course, those who can't afford the few dollars it costs don't have to include HyperCard with their shipping products. I find this very intelligent move by Apple somewhat

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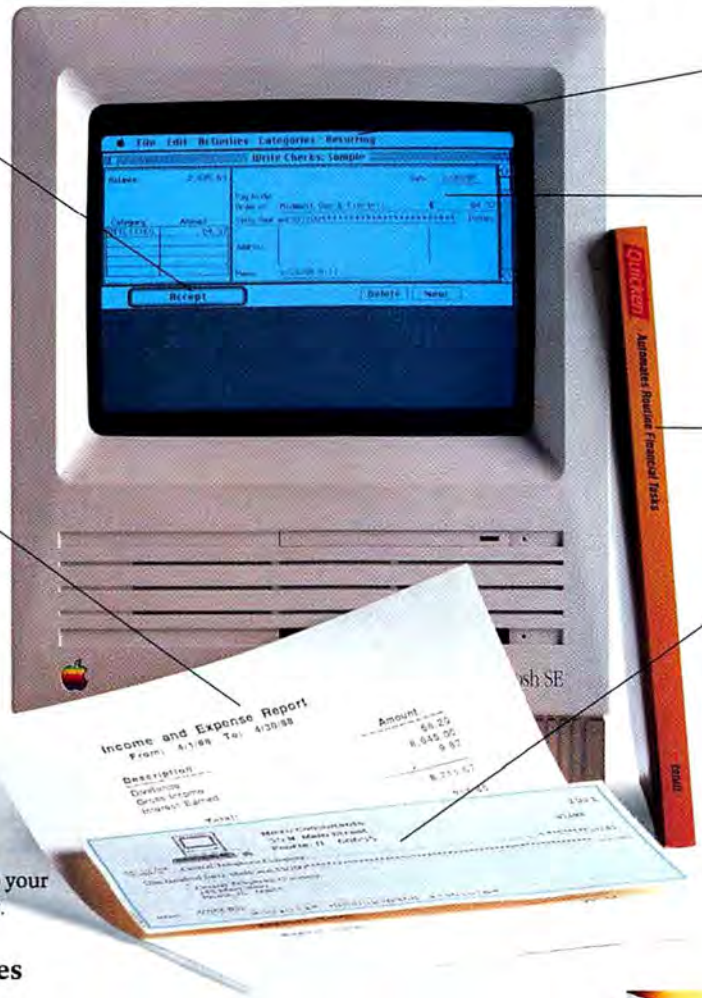
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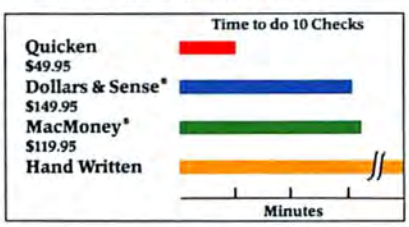
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ironic, because I've recently heard they've been "encouraging" other developers (not stackware developers) to no longer bundle the standard System software with their products.

CD CHANGES

Here's some more good news for CD-ROM developers. Laser Optical Technology — yet another name for the company that first introduced optical disc technology to the Mac under the LoDown and Arc Laser Optical Technology (ALOT) labels — and Philips and Du Pont Optical (PDO) have joined their considerable forces to reduce their prices for first-time compact disc developers. They are charging a flat $2,000 for mastering and replicating 100 finished disks with three-color custom-printed labels and jewel boxes. They even throw in a copy of the CD Publisher formatting software. Turnaround time for mastering and replication is 10 days. The only catch is that you must provide your material on a LOT write-once read-many (WORM) cartridge. The LOT WORM isn't a bad place to gather your materials, but if you don't already have one, you'll need to acquire one. WORM drives list for $5,900, and cartridges are $175 each.

That price (and offer) is similar to that recently announced by Discovery Systems. (See The Open Window, August '88.) It differs in detail, but the unit price for an order of 100 discs (the only size of order LOT/PDO will do) is about 10 cents lower per disc than Discovery's price. The Discovery system, which has a $1,500 mastering charge and a $2 per-disc replication charge, seems slightly more flexible. But the differences aren't worth quibbling about. Both offers are a fantastic boon that should result in many more CD-ROM products than we would have seen under the old pricing structures.

PDO also offers one of the strongest quality guarantees in the business. They call it their No-Risk Disc Guarantee. They are sure enough of their quality control to offer free mastering of another disc if as little as one byte on a PDO-manufactured disc is faulty.

For more information, you can call PDO at (800) 433-DISC (or -3472, if your phone doesn't have letters) or call Robert Lindgren at LOT at (408) 426-7171. You can also write to LOT for more information. They're located at 3004 Mission Street, Suite E, Santa Cruz, CA 95060.

Image Club Graphics, pioneers in putting clip art on CD-ROM, have announced another interesting product. Their DarkRoom CD-ROM is a stock library of approximately 500 professionally shot photos. The black-and-white photos are in the sports, business, lifestyle, and travel areas. And as long as the photographer is credited, the photos can be used royalty-free.

Both offers are a fantastic boon that should result in many more CD-ROM products than we would have seen under the old pricing structures.

The photos are in TIFF format, which means that all major page-layout programs can import them. They can also be further manipulated in Letraset's ImageStudio and Silicon Beach's Digital Darkroom (which finally should be released by the time you read this).

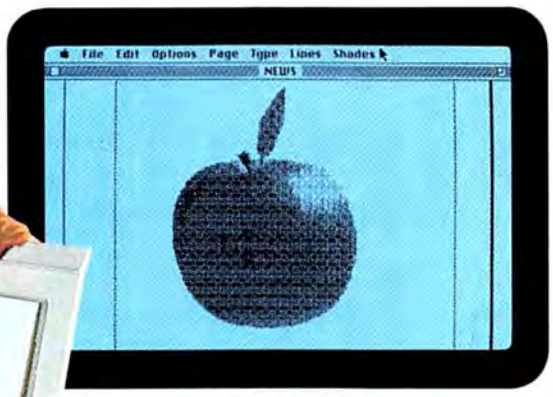
All of the photos were originally shot in color, and the CD-ROM comes with a color reference catalog. If you want to use the original in color, transparencies are available (for a royalty fee) from the owner of the photos, Focus Stock Photo, Inc.

The DarkRoom CD-ROM lists for $499. To order yours (it should be released well before you read this) or to get more information, contact Lorn McCausland at Image Club, 2915-19 Street NE, Calgary, Alberta T2E 7A1, Canada; (403) 250-1969.

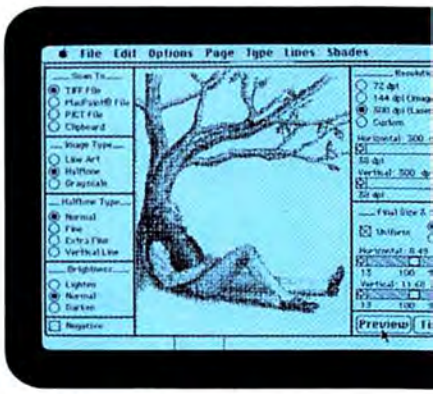
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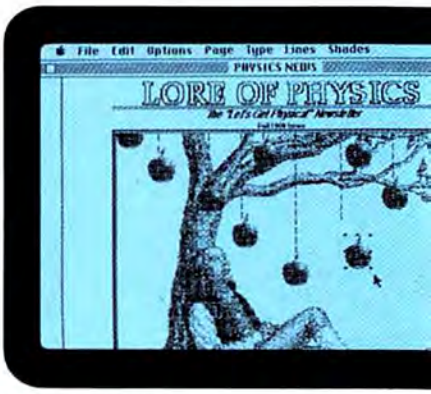
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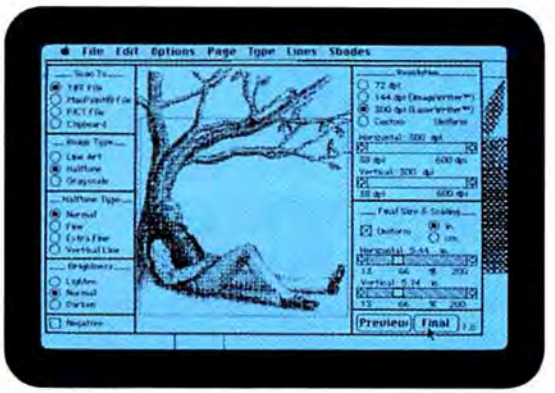


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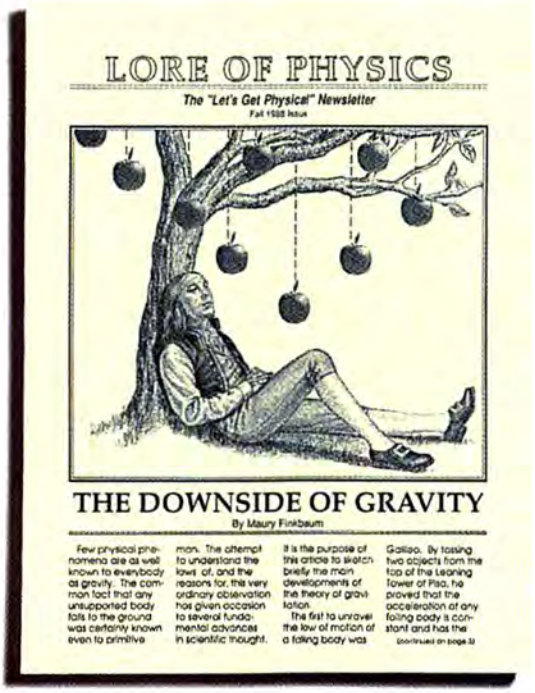
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Final Scan. Select a portion or all of your image to reduce or enlarge, and scan as line art, halftones, gray scale or negative images.


LORE OF PHYSICS

The "Let's Get Physical" Newsletter

THE DOWNSIDE OF GRAVITY

By Maury Finkbaum

Few physical phenomena are as well known to everybody as gravity. The common fact that any unsupported body falls to the ground was certainly known even to primitive man. The attempt to understand the laws of, and the reasons for, this very ordinary observation has given occasion to several fundamental advances in scientific thought.

It is the purpose of this article to sketch briefly the main developments of the theory of gravitation.

The first to unravel the law of motion of a falling body was Galileo. By tossing two objects from the top of the Leaning Tower of Pisa, he proved that the acceleration of any falling body is constant and has the

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Quick Clicks

Quick Clicks are short reviews of released products — not beta release, pre-release, or vaporware. If it appears here, it is available commercially.

The 5-Mouse Rating

🖱🖱🖱🖱🖱	EXCELLENT
🖱🖱🖱🖱	VERY GOOD
🖱🖱🖱	GOOD
🖱🖱	FAIR
🖱	POOR
💣	DOESN'T WORK

HYPERCARD

ScriptExpert

ScriptExpert is the HyperTalk helper for constructing HyperCard scripts. It provides buttons for many of the commonly used HyperTalk statements and prompts you through the correct use of the language. If you're an occasional HyperTalker, ScriptExpert can assist you in several ways: You'll take fewer dives into the reference books looking for keywords and command formats, you'll type less, you'll be held by the hand through creating blocked statements, and you'll see and learn the correct format for HyperTalk commands as they're added to your developing script.

ScriptExpert's starting screen has three buttons. The "Install in Stack" button places a ScriptExpert-activation button in the Clipboard, ready for pasting into whatever stack you choose. Click on "Begin Scripting" and you'll be asked whether you're building a handler or a function. If you're confused here, you can click for help and get a one-card refresher course in the philosophy of handlers and functions. If your handler is for mouseUp (and most will be), you can click "Give me a Starter Script" and immediately begin a mouseUp handler.

ScriptExpert's main menu provides an array of 35 buttons, each of which corresponds to a HyperTalk command. Another set of buttons selects the system message to which a handler will respond (mouseDown, openStack). Yet another array of buttons helps you select from the standard HyperCard functions.

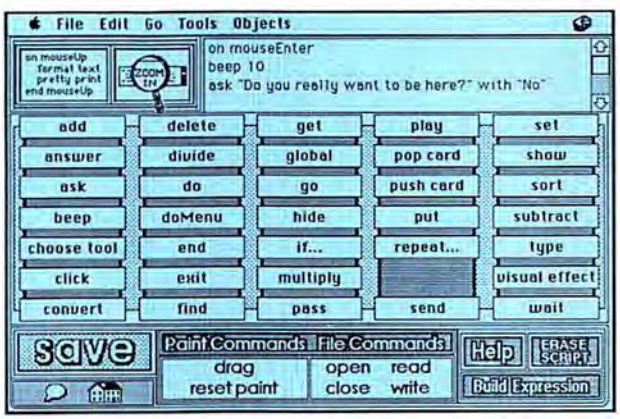
After you click a button, ScriptExpert prompts you, in a logical sequence, for any associated elements like values or container names. The prompts and other guided steps are based on the type of action being scripted. To help keep statements valid, ScriptExpert hides buttons that are inappropriate in the current context.

As you click and type, your script develops in a small scrollable window. You can review and edit script lines here, or you can ask for a broader look, which shows the script in a field that is as wide as a card but only two thirds as high. Here you can view, scroll, edit, and even undo all the changes you made while in this wide view. ScriptExpert installs quotes, properly indents the body lines and correctly labels the end of a script with an "end mouseUp." At any time you can have the script formatted and printed, or saved to a text file.

At the end of a session, ScriptExpert prompts for a filename to save the script. If you click cancel, you're offered the choice of abandoning or keeping the script. If you choose to keep it, ScriptExpert copies it to the Clipboard and whisks you back to your target stack, where you can paste the Clipboard into any target object. That's the basic sequence. You can continue working in your target stack or click the ScriptExpert button and go another round.

ScriptExpert can be useful to those who understand HyperTalk principles but don't use the language enough to memorize the commands, their precise constructs, number of parameters, and the other trivia that necessitates constant thumbing through heavy books. ScriptExpert's own manual is admittedly thin, placing the burden of enlightenment on its scripting stack and on your own wits and experience. I wouldn't classify it as a training tool, nor as a substitute for a good HyperCard/HyperTalk reference book.

For the frequent HyperTalk programmer, ScriptExpert can serve as a



ScriptExpert's main menu displays an array of buttons that correspond to HyperTalk commands. As you click on buttons and respond to dialog boxes, your script develops in the scrolling field at the upper left. Clicking the "end" button ends both your script and your scripting session.

ready reference and an occasional helping hand. However, its tightly controlled sequencing of events, combined with HyperCard's lumbering speed, might eventually try your patience. To be useful to more advanced programmers, it should have a true language-reference mode where the syntax of each command appears in its entirety as a template, ready for cutting, pasting, and editing.

The "expert" part of this stack is evident. Its coverage of HyperTalk is quite extensive. But its interface lacks a few coats of polish. For instance, ScriptExpert always asks whether you want to save your script to a file. This should be an exception and not the default case, as scripts usually are headed for buttons or fields. If you decline to place the script into a file, ScriptExpert then asks whether you want to abandon the script. One wrong click and you can trash an entire session of painstaking dialog boxes and responses. If you do decide to abandon the script, you're sent Home and not back to your target stack.

Although the Ask and Answer dialog boxes contain buttons of fixed size, ScriptExpert lets you enter text strings longer than the buttons can contain. A simple length check would prevent this. Using command buttons, you can show and select the painting tools and patterns. You must, however, specify mouse drags and clicks numerically, using horizontal and vertical coordinates. There should be an option to drag the mouse and have ScriptExpert figure out where you started and stopped. When you click the Play command button, it prompts for the sound and the notes to play but then tells you to add the notes yourself between the quotes in the script line. Here it could display a labeled piano keyboard and let you simply click on the keys, with the ability to undo the last note. Finally, and I mean this literally, ScriptExpert allows you to quit HyperCard without asking whether you want to save the script in progress.

The only bug-like problem I found was in trying to script the closing of a text file. Every time I clicked the "close" button, a repetition of my last "read" or "write" command was added to the script.

The shortcomings cited here are not all deadly serious, nor do they detract greatly from the usefulness of this well-constructed scripting tool. This stack has a lot to offer. But to provide greater utility, ScriptExpert needs a few enhancements that could easily be added either by Hyperpress in response to users' feedback or by the adventurous scriptors who are "Hyped" enough to customize their own copies of the ScriptExpert stack.

ScriptExpert ♟♟♟♟
List Price: $79.95. **Published by:** Hyperpress Publishing Corp., P.O. Box 8243, Foster City, CA 94404; (415) 345-4620. **Version:** 1.0. **Requires:** HyperCard. **Compatibility:** MultiFinder and Mac II friendly. **Application Size:** 258K. **Copy Protection:** None.

— Salvatore Parascandolo

HyperAtlas

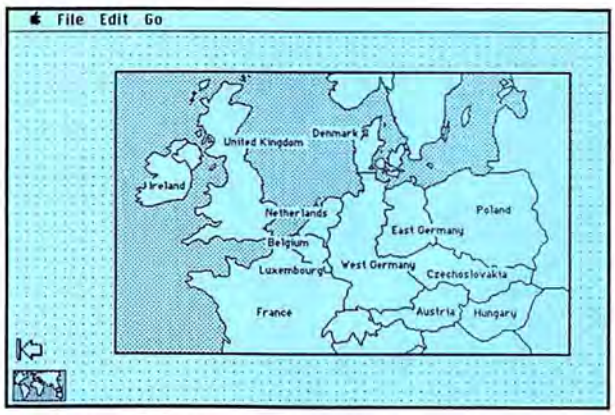
HyperAtlas is a misnomer. Usually the word *atlas* denotes a compilation of reference diagrams, specifically geographical maps. Though maps are its unifying theme, the true focus of HyperAtlas is information management. The maps are there merely to provide a geographical framework for data. So, if you buy it as an electronic replacement for your trusty *Hagstrom* or *Hammond's,* you're sure to be disappointed. However, as a quick and easy way to correlate information with geography, HyperAtlas is handy.

HyperAtlas is a network of HyperCard stacks organized into two geographical collections: The World and the United States. As well as maps, each collection includes Info stacks, containing economic (World stack), political (U.S. stack), and population (both) data; also included are User stacks, which are predesigned cards ready to accept information, and Import stacks, which facilitate the transfer of existing databases. Built-in links permit the two sets to be used in concert with each other.

Consisting primarily of simple outlines, the maps in HyperAtlas are far from reference quality. Most, in fact, are the same plots available in the MacAtlas clip art disk from MicroMaps. From the world map, you click on areas to be magnified. But, of course, this is not a true zoom; you simply move from one card to another. The regional maps are not much more detailed, but clicking on the edges of some maps shifts you to another card with a more centered view. In the U.S. stack, the state maps have county boundaries drawn, but you can't zoom in any further.

The labels, which identify individual countries in the world regional maps and cities in the U.S. states maps, are buttons leading to Info cards for those particular locations. The data in the Info stacks included with HyperAtlas is useful enough, but it is general in nature and readily available in an average almanac — at much less cost.

So HyperAtlas must sink or swim on the strength of its architecture. And that's pretty good. What you really get



HyperAtlas brings the world to HyperCard in the form of maps and demographic information that are linked to form a geographic database. Population and economic information is only a click away to another information-packed card.

for your 99 bucks is a framework on which to build your own data structure.

In accordance with HyperCard philosophy, HyperAtlas is unprotected. Any card may be copied and modified. New stacks or cards may be added as necessary. Maps can incorporate new locations with buttons leading to user Info cards. Stack links are in place, and scripts governing their operation are already formulated. HyperAtlas is like a cake mix — just add data.

Of course, as with a cake mix, you can find yourself constrained by the recipe. HyperAtlas is designed to work primarily with stacks that hold one card per location. For example, if more than one record is attached to a location (like a dozen clients in one city), HyperAtlas can't sort them to order. When you go to the Info stack from that location's Index card, only the first entry is returned. You can't page through them all unless you use the Find command or build your own links from card to card.

Also, before data is imported, it must be properly prepared. The Import stacks read tab-delimited text files, but records are restricted to ten fields, a geographic name must be the first field of each record, and its spelling must exactly match that used by HyperAtlas. If your database uses abbreviations for state names, they will have to be fixed before the information is imported.

Though Info cards can be customized, HyperAtlas is sensitive about the name of the card and the content of its name field. According to the manual, if these are changed, stack links will malfunction.

Having said all that, is HyperAtlas worth the money? Well, consider the cake-mix analogy. Though HyperCard is easy to work with, building stacks is — any way you look at it — programming. Just as very few of us make cakes from scratch, most Mac users aren't likely to have the time or the inclination to build an application of this caliber. That's worth something.

HyperAtlas is competently constructed stackware and (for the moment) is the least-expensive commercial product of its type. If you can live with its recipe, it can provide a useful mechanism for organizing data geographically.

HyperAtlas ½½½
List Price: $99. **Published by:** MicroMaps Software, Inc., P.O. Box 757, Lambertville, NJ 08530; (609) 397-1611, (800) 334-4291. **Version:** 1.0. **Requires:** 1 megabyte, second disk drive, and HyperCard; hard disk recommended. **Compatibility:** Mac II and MultiFinder friendly. **Copy Protection:** None.

— Carlos Domingo Martinez

PERSONAL FINANCE

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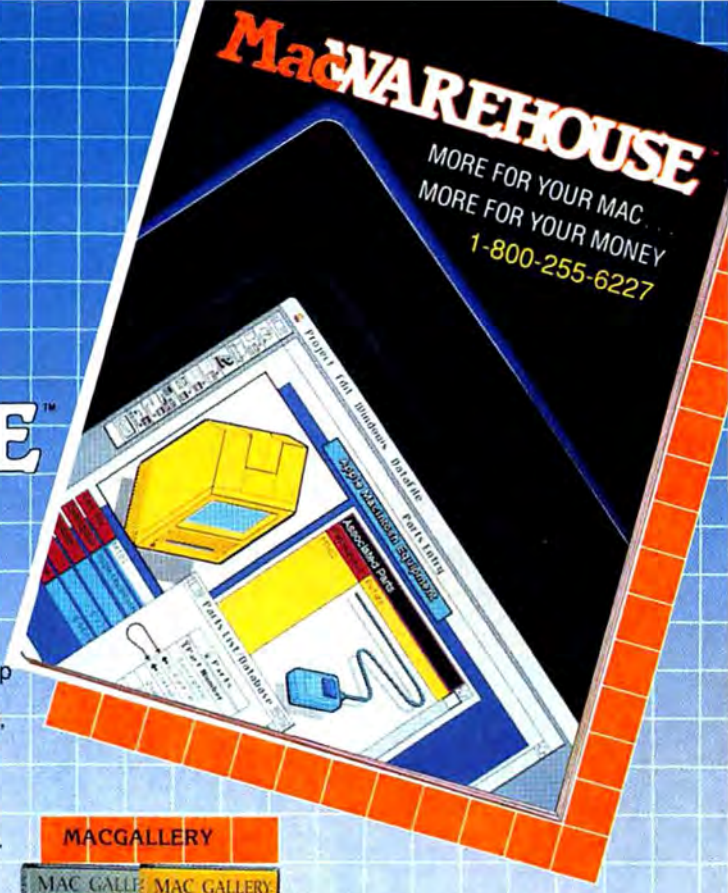
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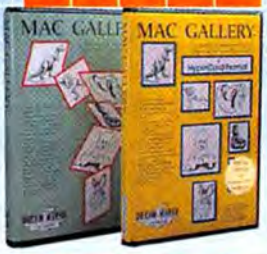
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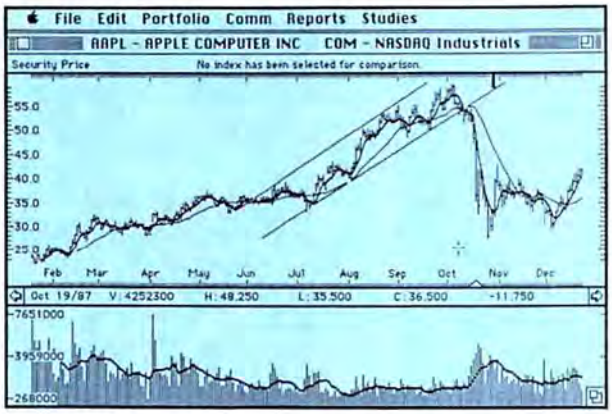


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Quick Clicks



Wall Street Investor takes the daily stock prices of a company, which you download from an electronic service, and charts them against different indicators like the Standard & Poor's Index. Shown here is Apple Computer's performance in 1987. Notice the big dip during the October crash.

ceive dividends, the program tracks your unrealized gain or loss and accumulates dividend income. When you sell, the program totals the realized gain or loss. Wall Street Investor tracks your transactions and prints out a variety of portfolio summaries.

The technical analysis menu is the highlight of the program. Technical analysts — who like to say "the trend is your friend" — chart stock prices and trading volume, trying to hop aboard when a stock trend is upward and bail out when it falters. Wall Street Investor allows you to draw trend lines and create a variety of moving averages; you can also calculate a number of more esoteric price- and volume-based indicators.

Overlaying the technical indicators on the price charts creates a chart that is every bit as impressive as the ones spewed out by your broker's research department. The manual does a good job of briefly explaining how the indicators are calculated and interpreted. It also contains a bibliography, as well as lots of boldfaced disclaimers decrying all responsibility for investment decisions based on the charts, which is only prudent. Many investors believe that charts are about as reliable as advice from Nancy Reagan's astrologer. For those people, Wall Street Investor offers the fundamental analysis capabilities as well.

Fundamentalists monitor the economics of a company as revealed in the income statement and balance sheet. Using the fundamental analysis menu, users can choose from among 115 downloadable "facts" — time series culled from the 10K reports that publicly traded companies file with the SEC. You can display the results in a numeric or graphic format, or save them for manipulation in Excel. For instance, an investor checking out a possible takeover candidate might watch the trend in a company's net worth and compare it with the capitalization — the value of all shares outstanding — to see if an arbitrageur could buy the shares, sell the assets, and realize a profit.

Wall Street Investor has one special distinction: one of the most ingenious copy-protection schemes ever devised. The program disk is not copy-protected. However, the program will not allow you to download data from an existing I.P. Sharp account. It's either open a new account through a designated vendor or manually collect and input hundreds of data items. Trouble is, the account you open will be linked to a unique ID number contained in your copy of Wall Street Investor. In practical terms, this means that anyone who downloads prices with a copy of your software will also incur charges to your account. Giving away Wall Street Investor is like handing out signed copies of your American Express card.

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Wall Street Investor ½½½½
List Price: $495. **Published by:** Pro Plus Software, Inc., 2150 East Brown Road, Mesa, AZ 85203; (602) 461-3296. **Version:** 2.1. **Requires:** 1 megabyte, two 800K drives or hard disk. **Compatibility:** MultiFinder and Mac II friendly. **Application Size:** 361.5K. **Copy Protection:** None on software, requires an I.P. Sharp account.

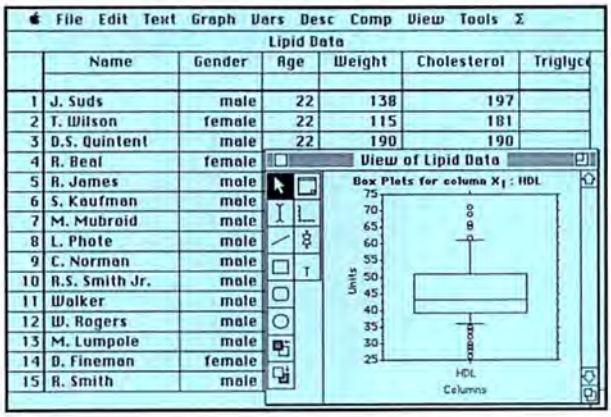
— Dan Armstrong

NUMBER CRUNCHING

Statview II

StatView II is StatView grown up. Meaner, faster, and more colorful, it's a remarkably complete statistics and data-analysis package. Unlike its older siblings, StatView and StatView 512, StatView II is meant especially for the Mac II. It takes full advantage of the II's color monitor (if present), math coprocessor, and additional speed. If you work with any kind of descriptive, comparative, or multivariate statistics (and you've the hardware), this is the program for you. If you don't have the equipment yet, this program might be a good reason to upgrade.

Everything you'd expect in a statistics program is here and then some. You might not even have heard of all the analytical methods available. Enter data (or import it seamlessly from a spreadsheet or database) and then describe the data set by its mean, standard deviation, minimum, maximum, range, median, mode, geometric mean, harmonic mean, and frequency distribution. Compare data sets using a t-test, Pearson correlation, ANOVA table, four different kinds of regression analysis, and contingency tables that incorporate the latest cell-contribution methods. Or perform nonparametric tests like Mann-Whitney or one of seven others. Even perform multivariate analysis using exploratory factor methods. And, since StatView II is optimized for the Mac II, do all this tak-



StatView II analyzes statistics with more finesse than most programs. The powerful charting and graphing capabilities let you see the results in color on the Mac II.

ing full advantage of the 68881 coprocessor's native speed.

Once you've massaged the data, put the stunning graphics to work. Generate the same scattergrams, line, pie, and box charts you might get from other programs, but highlight them with colors anywhere. Then go beyond what most plotting programs can do and create graphs with error bars, box plots, histograms, or percentile graphs and color those too. A complete toolbox is provided so you can add text, arrows, boxes, and diagrams anywhere on a plot. Data sets, analyses, and graphs are linked and can be displayed together, so changing a data point automatically redraws the graph and updates the analysis. Graphs and tables can be copied into any program that accepts MacPaint or MacDraw pictures, and analysis results can be copied as text and pasted into spreadsheets, databases, and word processors.

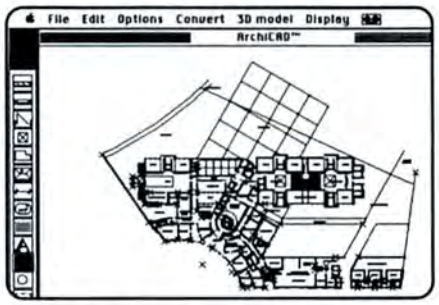
Of course, your graphs and charts will look only as good on paper as the printer they come from. StatView II supports color output from an ImageWriter II with a multicolored ribbon, and black-and-white output from ImageWriters and LaserWriters. If you want more colors or better resolution, you'll need to provide "driver" software that will work with the printer, plotter, or other device of your choice (similar to the ImageWriter and LaserWriter files provided by Apple for its printers). I didn't have the opportunity to test StatView II with non-Apple printers, but it should provide excellent output from standard IBM/Hewlett-Packard pen plotters and many other kinds of equipment if you have driver routines like those available from Cricket Software and other companies.

If the program has any flaw, it's that the maximum size of a data set is limited by the memory available on your Mac. This flaw isn't serious, though, since a Mac with one megabyte of memory can handle most files that can be generated in Excel. Unless you work with very large data sets all at once, don't worry. In extreme cases, MultiFinder and RAM caches may have to be disabled. If the worst happens and StatView II runs out of memory, a dialog box gives you the chance to save all your work and then exit gracefully so you can split the data up and work with it a section at a time.

The manual contains more than 270 pages of easy-to-find and use information. The table of contents and index are thorough, and the examples are backed up with some interesting real-life cholesterol data files on disk. A "Quick Start" chapter lets you use StatView II immediately, and the formulas used in every part of the program are listed and fully referenced in an appendix so you'll know how all your answers were calculated.

If you used StatView 512+ (see December '86 for a feature review), all data files from the older program will import automatically, though some files will require minor changes. You should find StatView II a very natural extension of the earlier versions. If you've never had the pleasure of working with either product before, you're in for a pleasant surprise. StatView II represents an intuitive, well-imple-

ARCHITECTURE



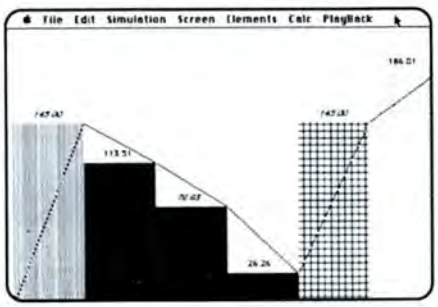
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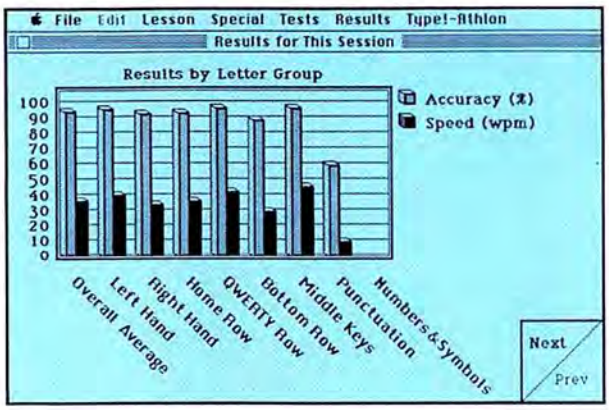
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StatView II
List Price: $495. **Published by:** Abacus Concepts, Inc., 1984 Bonita Avenue, Berkeley CA 94704; (415) 540-1949. **Version:** 1.01. **Requires:** Mac II or SE equipped with 68020 and 68881 math coprocessor; two 800K disk drives or hard disk. **Compatibility:** MultiFinder friendly. **Application Size:** 648K. **Copy Protection:** None.

— Linda Custer



Type! teaches typing to the hunt-and-peck artist and novice alike. Shown here are the accuracy and speed statistics for each finger.

ORGANIZATIONAL TOOLS

Acta



Writing and outlining go hand in hand. You've heard that so many times that you might believe it's a cliché. It's not, as any good writer will tell you. Outlining isn't always necessary, but preparing an outline helps sharpen your ideas. That's why outlining software is so popular.

Outliners are available as stand-alone applications (like MORE and ThinkTank), DAs (like Acta), and as parts of word processors (as in Word and FullWrite Professional). The best and most versatile are the stand-alone products (in particular, MORE). However, the stand-alone outliners aren't very good word processors. So, if you want to outline and write in the same session, you frequently need to quit and switch or use MultiFinder (which isn't a reasonable option for most users who have 1 megabyte of RAM or less). And the outliners built into the word processors are, at best, fair. That leaves DAs.

DAs are the natural place for an outliner. If the outliner is a DA, you can use it freely while in any word processor, page layout program, or other application. And if the outliner is one of the absolute best outliners available (as Acta 2.0 is), then you've got the best of both worlds.

On a very basic, do-a-simple-outline level, Acta works easily and offers no surprises. Topics and families are easily created and modified. There are Command-key equivalents for virtually all options. Up to four different outlines can be on-screen at once. You can cut and paste between an outline and the application you're currently running.

Topics and families can be expanded or collapsed at a click (or key combination). Selections can be dragged to new locations within outlines. Topics are restricted to 32,767 characters (32K). Outlines can run up to 2,000 levels deep, although your screen width restricts the number you can actually see (about 30 levels on a Plus or SE, more on a II). Topics can be sorted either alphabetically or numerically, and sorts can be either A-to-Z or Z-to-A ordered. Multiple typefaces are possible within outlines, although topics are restricted to a single typeface. Plain, bold, italic, underline, and outline type styles are supported. Mac II users can select from eight basic colors.

Acta comes preset to use New York as its default typeface, regardless of what your application font is set to, and to use curly rather than straight quotation marks and apostrophes. These would be major annoyances, if it weren't for a companion application called Configure Acta. This simple program lets you change the defaults in your installed copy of the Acta DA. You can specify both typeface and size, as well as how the items that you can set with the Options command should be preset. Neat, but also necessary.

There's one setting that's missing: the one that sets up the window size when you open Acta. You get a window about an inch narrower than the screen width. Yes, you can readjust or zoom it easily, but I'd like to see, at the least, several windowing options. For example, my preference would be for a shallower but wider window. Anyone reasonably familiar with ResEdit could hack WIND ID -16000 (in an uninstalled copy of the DA) to suit their taste, but that shouldn't be necessary.

Acta comes with a set of what it calls format drivers. These are placed in your System folder. They allow Acta to read and write various formats. The set of format drivers is constantly be-



The outlining tool, Acta, is robust enough to support its own manual on-line. A special "Five Minute Lesson" gets you up and running with little effort.

ing added to. At press time it included MORE, ThinkTank, WriteNow, Works, and RTF (Rich Text Format), as well as text-only and the Scrapbook.

Acta, until recently, was bundled with MORE. You might still be able to find it this way. In the future it will be bundled with Cricket Presents. A revision to version 2.0 is expected shortly also. It appears that, along with general enhancements, version 3.0 will add an application to run your outlines.

Acta is a well-designed, well-implemented program. If you outline, you should have Acta. If you write but don't outline, try Acta. You'll be a better writer.

Acta ★★★★½
List Price: $79. **Published by:** Symmetry Corporation, 761 East University Drive, Mesa, AZ 85203; (602) 844-2199. **Version:** 2.0. **Requires:** 512K. **Compatibility:** Mac II and MultiFinder friendly. **Application Size:** 65K. **Copy Protection:** None.

— Steven Bobker

EDUCATION

Type!



When I was in high school, the only people who took typing were the girls who were going on to secretarial school. Those of us on the college track were never offered a crack at the keyboard; and, if the truth be known, we would have disdainfully turned down the chance to take such a stigmatized course. Never mind all those term papers we would have to type in college; never mind that some of us would become writers; never mind that we might eventually wind up at a computer terminal.

Now an awful lot of us need typing skills. Despite the Mac's mouse, keyboard input is an all-important element of computer use. If you're a hunt-and-peck artist or a two-finger speed demon, you can use a program like Broderbund's Type!

I'll say right up front that the only fault of Type! is that, although it takes great advantage of the computer to test and analyze your keyboard skills and faults, it forgets that the computer lets you do more than a typewriter does. You can backspace in a word processor to make a quick correction, but not when you're at a typewriter. Type! doesn't let you correct mistakes; once made, a mistake is forever. And, on a more minor point, the program forces you to use two spaces after each sentence, which is more and more outmoded as computers become front-end typesetters.

It's hard to think of anything Type! leaves out. You can start with the basics of finger position at the home row, work on the letters there, then add the QWERTY row, and so on, gradually adding shifted keys, numbers, and punctuation. Training is in drills of short words and phrases. You can also approach drills from a different perspective: Instead of choosing the groups of keys (home row, QWERTY, numbers, and so forth) you can drill according to left or right hand or any specific finger. There are even categories like "Common words" and "Mirror images."

Type!'s analysis of your practice sessions is extensive, yet every aspect is useful. Words per minute, of course, is always available. But you can get analysis graphs by key, hand, or finger: Is your right hand better than your left? Are the little fingers on both hands weak? Do you keep missing the *Q*, or the *Z*? Analysis pinpoints your weak spots in easy-to-read graphs that note both speed and accuracy by every category. And, in case you can't decide what to do next, the program suggests specific lessons for you to work on.

No computer typing program would be complete without a skill-building game, and Type! has Type-Athlon. In the game, you're running hurdles against the computer; each of you has a figure at the bottom of the screen. As long as you type the phrases in the window, your figure keeps running and jumping; if you make a mistake, your figure falls with an amusing "splat" sound effect. When you fall, you lose a few precious seconds because the other runner keeps going.

Type-Athlon lets you play in any of the drilling categories (such as hand, key groups, common words, specific fingers). The speed of the "other" runner is automatically set at your last Words-per-minute drill speed, but you can reset the speed at any time. If you lose, the game automatically notches down the speed by five words a minute.

Type! is a complete typing tutor. The "weak spots" analyses are great, the game is fun, and even the drill phrases are interesting. You can't lose.

Type! ★★★★
List Price: $44.95. **Published by:** Broderbund, 17 Paul Drive, San Rafael, CA 94903; (415) 492-3500, (800) 527-6263. **Version:** 1.0. **Requires:** 512K. **Compatibility:** MultiFinder and Mac II friendly. **Application Size:** 226K. **Copy Protection:** None.

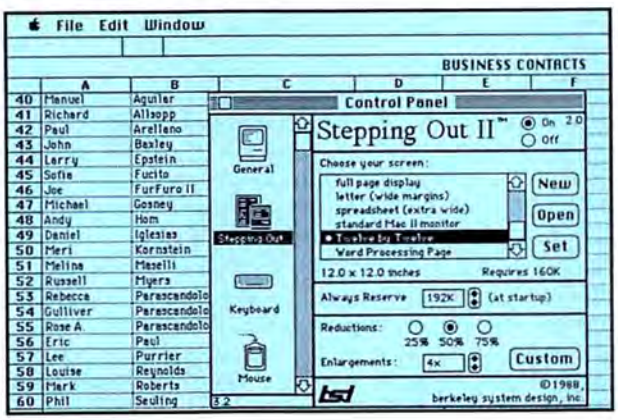
— Sharon Zardetto Aker

UTILITIES

Stepping Out II



A fact of Mac life is that most documents, even one-pagers, contain more than the physical Mac screen can show. To see more, you nor-



If you don't have the bucks to buy a big screen monitor, Stepping Out II is a software alternative that provides some of the power. Through the Control Panel, you fool programs into thinking that the Mac's internal 9-inch monitor is actually larger. The screen will then scroll to the preset width and height as you move the mouse.

mally use scroll bars to tell your applications which way to shift your view. Large monitors show more of any given document, and practically eliminate the need for scroll bars. Their only drawbacks are that they are expensive, bulky, and don't quite fit in a nook or cranny of a tote bag. That's where Stepping Out II steps in.

Stepping Out II is a *software* substitute for a large screen display. As such, it has no physical inconveniences or limitations. With enough RAM in your Mac, you can have the equivalent of an immense screen.

How is it possible to see a wide view with a small monitor? Well, scrolling is still required, but Stepping Out II handles that for you, instantly and smoothly.

Stepping Out II convinces your programs that they're writing to a large RAM-based *virtual* screen. So they open and fill working windows much larger than your Mac screen can show at once. You can easily navigate these wide expanses because the edges of your screen become sensors that trigger lateral or horizontal scrolling. Whenever you touch an edge with the cursor, off you go. You don't need to click somewhere and wait. Instead, you mouse left, and you go left; you mouse up, and you go up. . . .

All application windows, although larger than usual, behave normally. They retain their scroll bars, which you may never need if you set up a virtual screen that's large enough. If you're typing text into a wide document, Stepping Out II follows the cursor as it touches the edge of the screen and autoscrolls as you type. I find Stepping Out II especially useful, and often indispensable, for graphics and desktop-publishing programs where, for a modest amount of RAM, I can have a tabloid-sized monitor with instant reduced or enlarged *working* views.

To use Stepping Out II, you must copy the icon into your System folder and restart. Thereafter you can activate it and customize it through the Control Panel, even from withjn an application. During the setup process, you can define and name new virtual screens or edit the attributes of existing ones.

You can then designate one screen size as the default. Screen sizes can be specified in pixels or inches or by dragging the corner of a rectangle that represents the virtual screen. Stepping Out II then calculates and displays the RAM required for the job. During startup, Stepping Out II reserves enough memory to ensure that you can have your big screen anytime without shortchanging your applications in mid session.

To keep the menu bar and any left-side tool palettes in view, you can set up resizable nonscrolling regions along the top and the left side of the physical screen. These areas remain perfectly functional, but they never leave your sight. It's now possible to efficiently use Stepping Out II with Excel and other spreadsheets because the formula bar can remain visible in a nonscrolling region regardless of the location of the active cell. One drawback: You cannot fix any tool palettes at the bottom or right of the screen. This can be a problem if that's where your application has an unmovable control area like a scroll bar or palette (as do Cricket Draw, PageMaker, LaserPaint, and others).

Stepping Out II automatically shifts your view to any dialog box that pops up or to any window that becomes active — a welcome feature when using applications like MultiFinder, Reflex, or Excel. Other useful features are activated with Command-Option key combinations: Screen reductions of 25, 50, and 75 percent; screen shots the size of a full page; a resizable rectangular magnifying lens that follows the cursor, and enlarges the covered area from 2X to 16X. In both the magnified and reduced views, the tools and features of your applications are fully functional. If you hold down the Option key while launching an application, you'll have a large screen until you quit (this feature is not MultiFinder compatible, though).

On a Mac II, the extra speed essentially nullifies Stepping Out II's processing overhead. Now for the expensive news: If you work in color or grayscale, you'll need at least two megabytes — and more if you use it with high-end graphics programs like Illustrator 88 or PixelPaint. For example: A 12-x-12-inch screen uses 798K at 256 colors, 433K at 16 colors, 251K at 4 colors, and 160K in black and white. You can minimize the RAM expense by adjusting the virtual screen size to the exact dimensions of the *usable* document area, not to the physical page dimensions. If your application is usable in black and white, as most are, you can do your large-screen work in that mode, then deactivate Stepping Out II and shift to color for the finishing touches.

Stepping Out 1.1p was reviewed in depth in the March '88 issue of *MacUser*. Stepping Out II is larger, but also vastly improved in features, speed, and transparency. Every noted shortcoming of version 1.1p is fixed. I highly recommend this solid product for your graphics arsenal. Use it. It's one of the best productivity tools around.

Stepping Out II ★★★★★
List Price: $95. **Published by:** Berkeley System Design, 1700 Shattuck Avenue, Berkeley, CA 94709; (415) 540-5536. **Version:** 2.0. **Requires:** 1 megabyte. **Compatibility:** Mac II and MultiFinder friendly. **Application Size:** cdev, 59K. **Copy Protection:** None.

— *Salvatore Parascandolo*

HARDWARE

Colorvue SE



Everyone knows the II is the way to get color on a Macintosh. But there's another option too. The ColorVue board, from Orchid Technology, links an SE to an external monitor to display up to 16 colors at a time.

Installing the board into the Macintosh SE's expansion slot is quite simple. It just requires the right tools and a little know-how. The ColorVue board has two video output jacks that connect to displays with a resolution of 640 x 480 pixels — one jack for an AppleColor High Resolution RGB Monitor and another for an IBM-style VGA monitor. The documentation also describes the cables required for

multiscan monitors.

Choosing a monitor to work with is done through the Control Panel. (Orchid includes the cdev file.) You choose the type of monitor and which monitor to have active — the Mac SE, the external color monitor, or both. You also choose the mode of the display — Black & White/Grays or Color — and how many grays or colors you want to use — two, eight, or sixteen. If you choose to use two colors, you get black and white regardless of the mode. With Black & White mode selected, though, choosing to use eight or 16 colors yields that many shades of gray.

The eight colors are the standard ones used for printing on an ImageWriter II or LQ. Most programs that support color do so with these eight. However, if you select 16 colors, the additional eight can be used only by applications designed specifically for ColorVue.

When you select eight or 16 colors, you'll instantly see three planes of color (red, yellow, and blue) sweep across the screen — even if the program you're running doesn't use color. (ColorVue uses the planer coloring technique, which layers three additional planes of color information behind the original layer.) You will immediately notice how much slower things move.

To get around the speed problem, Orchid provides the Automatic option, which keeps the screen in Black & White mode until color is used by an application. The majority of the time, you'll get fast performance in Black & White — only slowing down when color is available.

ColorVue comes with a utility to save a screen image to disk in any of three different formats: PICT, TIFF, or MacPaint. A screen-dump capability lets you print the screen on whatever printer is currently selected in the Chooser, including LaserWriters. Other goodies include a screen saver.

The documentation is simple and straightforward, though I would have liked a few simple explanations, such as why you can't get color backgrounds and menu bars and why some programs that use color won't display color with the ColorVue board.

In general, if an application follows Apple's guidelines allowing maximum compatibility across a wide range of systems, then the program will work correctly with ColorVue. The first two programs I tried, FreeHand and Crystal Quest, didn't produce any color but still worked in Black & White mode.

The problem with a color board for a computer never designed for color is that if Apple ever changes its ROM then the ColorVue ROM must also be replaced. (Such a change is unlikely, though, since Apple doesn't think that 16 colors is enough and because they use the color QuickDraw model in the Mac II).

The list price of a Mac II, 1 megabyte of memory, an AppleColor monitor, and a video card is at about $5,500; the Mac SE with the AppleColor monitor and the ColorVue SE board is around $4,600. About a thousand-dollar difference (you can probably find the board for a $499 street price). That gives you a more economical solution for color output. It may make sense if you need a color display and want to maintain the portability of a Mac SE between work and home.

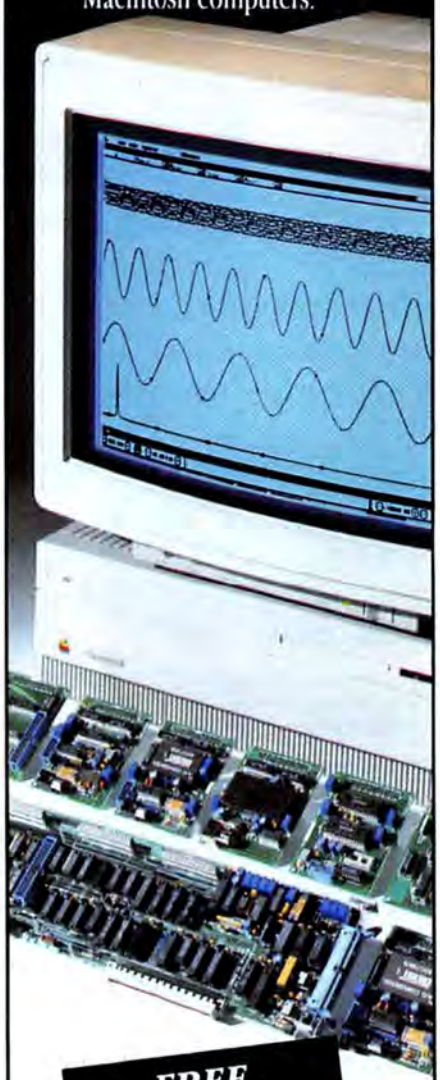
Two bits, four bits, eight bits, a dollar. If you really want color, then give



The ColorVue SE board installs in a Macintosh SE to give color capability to that black-and-white computer. Up to 16 colors can be displayed on an AppleColor High Resolution RGB Monitor.

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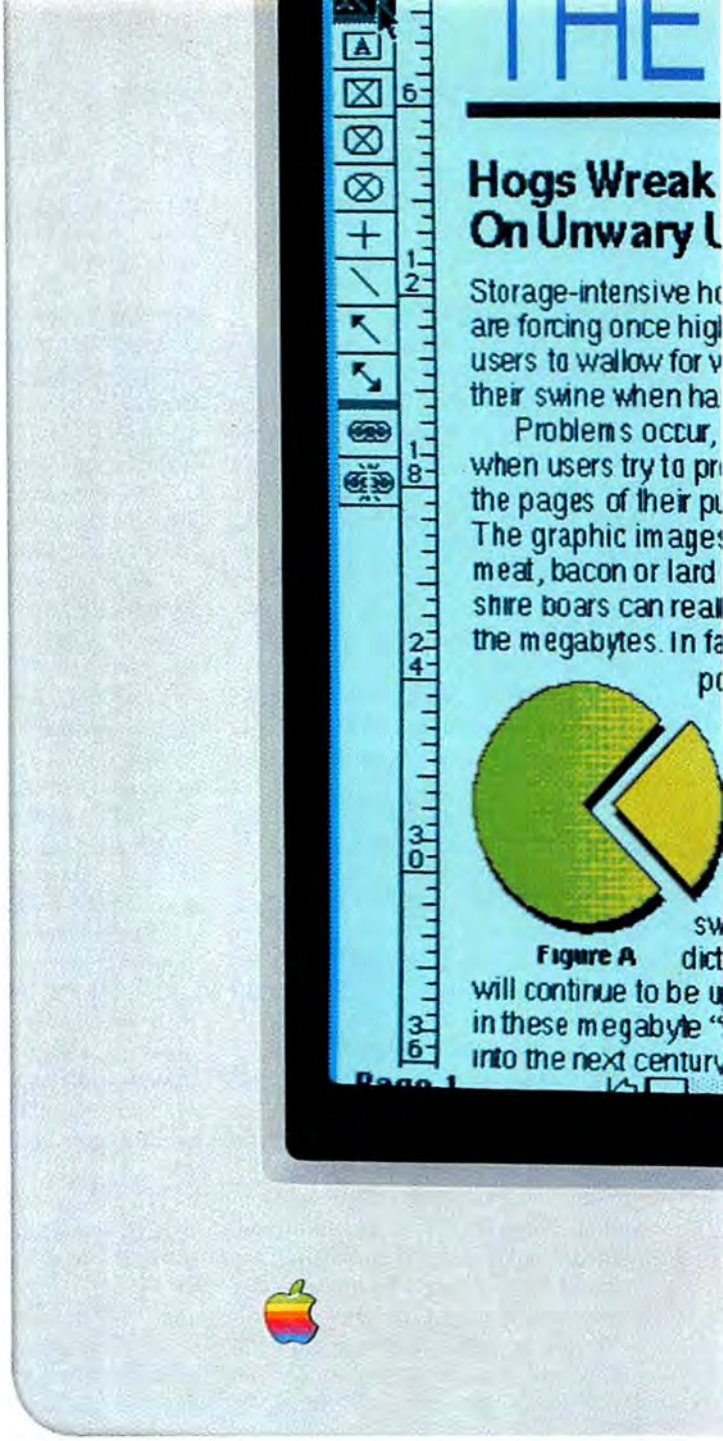
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Quick Clicks

Orchid a holler.

ColorVue SE½½½
List Price: $695. **Manufactured by:** Orchid Technology, 45365 Northport Loop West, Fremont, CA 94538; (415) 683-0300. **Version:** 1.0. **Requires:** Mac SE and external monitor with resolution of 640 x 480 pixels. **Compatibility:** MultiFinder friendly. **Application Size:** cdev, 26K. **Copy Protection:** None on software.

— Chip Carman

Radius Accelerator 25



Do you value speed? Work fast? Live fast? Want to compute fast? Really fast? Then get a Radius Accelerator 25 card. This add-in accelerator card for the SE has a Motorola 68020 CPU that runs at 25 MHz. And an option puts a 25-MHz 68881 math coprocessor on the card as well. The board evaluated here has the 68881. The SE used contained 4 megabytes of RAM.

The 68020 CPU is the same chip that powers the Mac II, but this one is able to and does run at 25 MHz, 9 MHz faster than the chip in the Mac II. There's also a speed gain simply because the SE does not have a NuBus and thus doesn't have to spend the tiny amount of time the Mac II spends looking at the NuBus and the boards on it. Overall, speed is more than 50 percent faster than a Mac II.

Radius, for warranty reasons, wants your dealer to install the board. However, installation is literally a snap. If you've ever had your SE open, you'll find it to be a five-minute procedure. Once the board is installed, you drag one file from the disk provided to your System folder, restart, and it's off to the races. To further optimize performance, you'll probably want to reformat your hard disk. Hard disks formatted for the SE normally use a 2-to-1 interleave. You can get noticeably better performance by reformatting with a 1-to-1 interleave.

I've used and given up on several accelerator boards in the past, including a slower Radius board. The reasons were always the same. The acceleration was not transparent; there were software compatibility issues. Some programs ran awkwardly or not at all. Sound wasn't handled well. They frequently were more of a pain than a benefit.

This board is different. It's as transparent as anyone could hope. Right after installing it, I ran every application on my disk. All ran and ran correctly. The programs included Word, MacWrite, WriteNow, PageMaker, Excel, RagTime, FullPaint, Smartcom II, and my rather large collection of utilities. All the games — freeware, shareware, and commercial — ran. I was both pleased and surprised. The only effect other than vastly increased speed was a slight but hardly noticeable degradation of my custom sounds (which are invoked for most disk operations by SoundMaster 1.2). Even MacWrite 4.5, a program notorious for its Mac II incompatibility, worked perfectly.

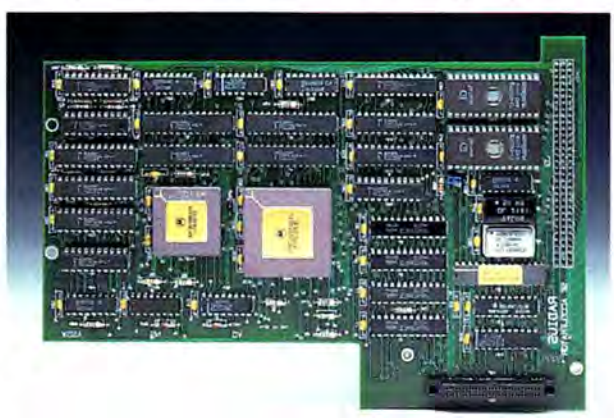
And the speed, the sheer speed. It's glorious. Imagine calling Word's Page Preview and having it appear virtually instantly, even in long documents. And you can scroll the pages so much faster. The Accelerator 25 naturally enough shines at applications that require massive amounts of number crunching. That's what the 68881 is so good at. And thanks to the Radius-supplied software, all programs, not only those specifically designed to do so, can take advantage of the 68881. It's very hard to tell if this always happens, but my observations indicate it does. Other operations that are very quick when using the Accelerator 25 are spreadsheet recalculations and anything involving lots of graphics. My tests showed a six to ten times improvement in speed. Recalcs that took 30 seconds with the accelerator turned off took less than 4 seconds with it on. Screen updates in graphics programs are much quicker, and applications like Illustrator handle much better (of course, the 4 megabytes of RAM help too).

Accelerators are pretty much necessary to get full performance from big screens. The Accelerator 25 has a Radius MagicBus slot so that you can plug the video board for a Radius Full Page Display or Two Page Display in directly. Using the Accelerator 25, graphics programs that are otherwise too slow to use effectively become desirable tools. It would be nice, although the SE's internal layout makes it rough, if there were also a standard 96-pin SE expansion slot on the board. That would make it useful with other big screens.

If for some reason you don't want to use the accelerator, shutting it off is a simple matter of restarting the SE while holding the mouse button down. Then you shut the accelerator off on the control panel that appears.

Radius says that there might be problems with some hard disks. Our unit worked fine with 20-, 45-, and 70-megabyte MacBottoms, various Rodime and Apple drives (including an internal Rodime drive), and the Jasmine DD50.

This board makes the SE the fastest computer you can run on your desktop (for now — a 33-MHz 68030 was just announced) and should be considered by anyone with a Radius FPD or TPD.



Your Macintosh SE can go nine megahertz faster than a Mac II when equipped with a Radius Accelerator 25 card. That's an increase in speed of about 50 percent. The Radius has a Motorola 68020 CPU that runs at 25 megahertz. An optional 25-megahertz 68881 math coprocessor is also available.

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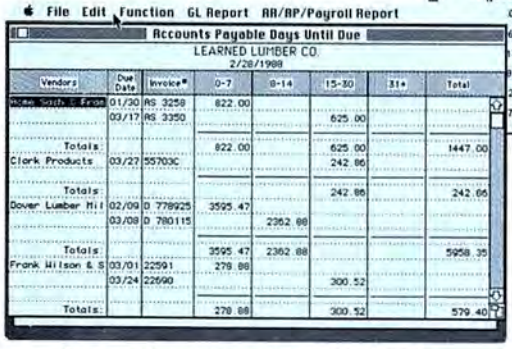
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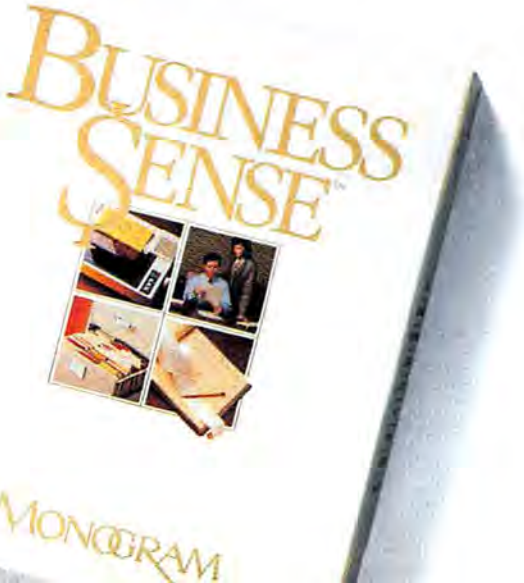
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*Business Software Magazine Accounting Survey, July, 1987

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Quick Clicks



The ProPoint trackball is an alternative to the standard Apple mouse for the Macintosh SE and II. It frees up desk space and makes rolling across a big screen one simple motion instead of several drags.

MacUser LABS

Test Results

(Actual Performance Time in Seconds)
4th Dimension Sort: 56.9
Excel Recalculation: 8.2
Word Scroll: 89.3
Load Application: 18.0
PageMaker Scroll: 19.5
MacDraw Redraw: 26.4
Normalized Average*: 27.7%
* The lower the number, the better the performance. The normalized average puts the product in a percentile range relative to other accelerator boards tested by MacUser Labs in the March '88 issue.

If your SE seems slow, this is the fix. You'll be the fastest kid on the block.

Radius Accelerator 25
List Price: $1,695; $2,195 with 25-MHz 68891. **Manufactured by:** Radius, 404 East Plumeria Drive, San Jose, CA 95134, (408) 434-1010. **Requires:** Macintosh SE. Version 2.0 ROM and 68881 in review unit. **Compatibility**: MultiFinder friendly. **Copy Protection**: None on software.

— Steven Bobker

Propoint

There are days when my mouse pad is buried under three manuscripts, a half dozen press releases, three or four loose disks, and a cup of coffee. Those are the good days. This makes mousing around not only difficult but also dangerous. The ProPoint, a mouse alternative from Abaton, lets me free up some desk space by putting all the point-and-click action in a trackball.

Trackballs are sexy, but they've been given a bad rap since they're usually associated with video games. In fact, trackballs do more for productivity than just clearing desk space; they travel across large monitors in one smooth roll instead of the several drags it takes with a mouse.

The ProPoint uses a regulation-size billiard ball (albeit slightly lighter) that rests freely in its own nook. Abaton says the ball can be interchanged with the ones from your local pool hall. Unfortunately, the ball is set a little too high to be comfortable.

The base is angled so that it fits snugly and in line with the height of the standard Apple keyboard. The Apple Extended Keyboard is a little higher, so you don't get the same clean lines. Cable ports on both the right and left side of the ProPoint enable you to set up the device on either side of your keyboard. Even though the trackball can be put on the left side of a keyboard, left-handed people won't find it easy to use. The buttons are positioned on the left side of the base, so lefties must either use their pinkies or contort their thumbs to click.

The ProPoint takes some getting used to. You may feel less precision at first. To compensate, slow down the mouse tracking speed in the Control Panel and you'll feel like you're in control.

There are two buttons: The larger is the normal click button like the one on a mouse; the second button is like a shift key on a keyboard. Press this shift button and it's as if you're keeping the regular mouse button held down. This makes scrolling through long hierarchical menus easier and is also useful for some graphics work.

The ProPoint is an optomechanical device as opposed to the Apple mouse, which runs mechanically. If you open up a mouse and remove the roller ball, you'll see wheels that spin as the ball moves across them. When the wheels move, they deliver position information to reflect where the cursor is on the screen. The ProPoint has similar wheels, except each wheel also has an optical LED focused on it. The light from the LED shines on lines that are etched into the wheel. As the wheel moves, the light bounces off a mirror and sends out position information.

Unfortunately, the ProPoint doesn't shine in the one area it should — rolling across large screens. The cursor drags when you try to roll from the lower right to the upper left. The ProPoint works fine on the small screen of an SE, but with a Mac II or a large screen display, the action isn't as precise.

If for no other reason, you can probably justify the cost of a trackball because of the time it will save you in scraping grit off the mouse wheels. Since the ProPoint ball doesn't slide over a mouse pad, it won't collect dirt as easily as a mouse. Also its bearings are self-lubricating, although they still need to be wiped occasionally with a rag and a mild cleanser.

People who complain that trackballs aren't as elegant as mice are probably the same folk who complained about using a mouse when they first bought into Macintosh. Spend a little time getting used to it, and the ProPoint can not only make room on your desk but also help you maneuver around large screens quickly and more efficiently. It's just too bad that the action isn't as smooth as the surface of the ball itself.

ProPoint
List Price: $139.95. **Manufactured by:** Abaton, 48431 Milmount Drive, Fremont, CA 94538; (415) 683-2226, (800) 444-5321. **Requires:** Mac SE or II. **Compatibility**: MultiFinder friendly.

— Ben Templin



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by Jim Seymour

The 'Big Lie' TV Spot

Apple's television advertising is sometimes even more interesting, and very occasionally even more appealing, than its computers. Apple and the Macintosh first hit television in a big way with the Ridley Scott, one-time, Super Bowl spot that introduced the Mac. When that young woman flung her ax through the cinema screen in a theatre full of zombies, Apple gave notice that computing was forever changed.

Then came the insulting "Take that, you stupid IBM customers!" Super Bowl follow-up, which portrayed corporate computer users marching lemminglike off a cliff — into, one presumed, the Abyss of IBM or the Slough of DOSpond.

More recently we've seen the wonderful Macintosh slice-of-corporate-life commercials, which capture what seem like remarkably true moments in business. The first I saw, more than a year ago, had senior management at some BigHugeCorp talking about a great piece of work — a report or maybe a proposal to a customer.

The boss got upset when he learned that the report was done on employees' own computers, which they had to bring in from home. As we looked down from Mr. Big's office window on those faithful souls slogging home with their Macs at the end of the day, he wondered why the company's own computers couldn't do work like that.

Fair enough: Macs *are* better for lots of corporate jobs, and the point was made in a memorable way.

A favorite of mine among the more recent entries in this group of Mac spots is the one with employees talking in a crowded, noisy lunchroom about a piece of work done under the supervision of one of the men at the table. As the lunch bunch admires the piece — another lavishly illustrated internal report, of the sort almost no one in the



real world prepares on a Mac or otherwise — we learn that it was pulled together by staffers from several points all around the country — all of them, one assumes (but is never told), using Macs.

Finally, one of the gang turns to the guy who ran the effort and asks what kind of computer they used to produce something that looks like *this?* In a marvelous bit of enigmatic understatement borrowed directly from Robert Altman's movies, he responds, mouth full of sandwich,"Maimwosh."

"Whaaaaa?" goes the table.

Louder but even more garbled, he blurts out through his chicken salad on rye "MAIMWUSCH!" Fade to black, bring up Mac logo, dump, and out.

It's another wonderful spot, fair enough once again. The wit of the almost-intelligible audio tag is what makes it work. The Mac has from the beginning been in substantial part about being "in," and the sense of inness among those who can figure out what the man's saying in that tag line seals the deal: The Mac is cool, and so are you, dear viewer. Now please give us a lot of your money.

But recently Apple's been running another TV spot in that series that is as bald and offensive and ultimately self-defeating a lie as I've seen in advertising in a long time. Apple is hurting itself, and thousands of its corporate allies, by foisting off this myth wrapped in videotape.

I call it the "Big Lie" spot.

We see a defensive and not-a-little-whiny woman being interviewed across a corporate big cheese's desk about expenses for PCs and PC training. "But why," the man asks her in the end, "do we have such low training costs in one of our far-flung branches?"

"Well," she simps, "because they have a different kind of computer there. And apparently people can train *themselves* to use it."

Aarrrggghhhhh!

Please, Mr. Sculley: Let's not have any more of this kind of blather in those expensive "good demographics" spots you're buying on the Sunday news shows, during golf tournaments, and at other times when oodles of corporate-bigwig decision makers are presumed to be watching the tube. Because it ain't so, John, and you and your agency people know it.

Lower training costs for Mac-using employees than for DOS-machine-using employees? Sure. Not phenomenally lower, but materially lower, so that kind of claim could be fair. But "people can train themselves?" C'mon: We all know it doesn't work that way.

I've trained a lot of corporate people to use Macs. In many cases that was because I was something of an expert

BOB SCOTT

on the DOS machines and DOS software from which those users were coming, as well as on the Macs and Mac software to which they were moving. In other cases these were new PC users, people not yet warped by years of staring at that sinister C) prompt.

Without exception, I consider the best Mac application packages — Microsoft Word, Ashton-Tate's FullWrite Professional, Excel, Trapeze, MicroPhone, and so on — to be easier to use and easier to learn than the best equally featured DOS programs.

And certainly performing such housekeeping functions as copying files, creating subdirectories, and formatting floppies is easier to manage with the Mac's Finder and System, especially for newcomers, than similar functions under DOS.

But I've yet to find a business Mac user who truly learned best through training himself or herself. When we talk about serious corporate PC use, we shouldn't be talking about getting a spotty, half-baked sense of a program — enough to start using it but without much confidence and without exploiting the program's internal shortcuts and productivity-enhancing features.

Of course, there are people who believe they learned how to use their Macs and Mac software by themselves and learned it well. But the fair-minded among them always admit when we talk about the learning process that it was full of false starts and unavailing jabs and feints.

Let me say this simply: In a business setting, where learning to use a computer means learning quickly and learning the *whole* story, including how things are done at that company, there is simply no way "people can train themselves" with anything like the efficiency and effectiveness of a well-thought-out training program.

Certainly that training may be easier and less costly to organize and implement for people using Macs than for people using DOS machines. And certainly office workers who know how to use one or two programs on the Mac have a head start when learning another program, whereas users of DOS machines can't rely on that kind of cross-program transfer of experience and intuition. But using Macs effectively in business takes training. Serious training. To launch people on that course by themselves is both an act of cruelty and a stupid business decision.

Maybe they can teach themselves. But not enough, not well enough, and not nearly fast enough to make economic sense. Unless, of course, cost-effectiveness doesn't mean anything in that shop. In which case the company needs a hell of a lot more changed than the kind of computers it puts on employees' desks.

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by Robert R. Wiggins

More Big Problems

Last month we started discussing some of the problems that mainframe computer users encountered years ago that are new problems to most Macintosh owners. There were too many to cover in one column, so some were covered last month and the rest this month. Backup, recovery, and system crashes were discussed last month.

Mainframe people learned early on to back up their data, and since tape came first in the mainframe world, they had an easy time of it. Macintosh hard disks are more difficult to back up, but it is just as important to do so, and the tools needed are being improved slowly.

Mainframe systems use several techniques so they can restore data to the point of failure. Macintosh owners are usually lucky to get their data back to the point where it was backed up. For the most part, fixing this is up to software developers.

Mainframe operating systems work very hard to minimize system crashes, and the support personnel work just as hard to keep the system stable. Macintosh users need to follow their example and keep careful track of changes to the operating environment.

And now we cover the last two big problems.

BIG PROBLEM #4: SOFTWARE UPDATES

Possibly the biggest problem ever faced in the mainframe world was how to maintain the vast amount of software used. A minor change to the operating system could affect important application programs. There was also a stability problem. Changes cause problems, so there had to be a way to keep track of changes made to the system software, and some method of backing changes off if problems occurred.



DAVE JOLY

IBM came up with an excellent way to handle this problem: a program to keep track of all changes. For their MVS operating system, the program was called SMP, the System Modification Program. When you installed a new piece of software, SMP installed it and recorded it and kept track of all the modules and bits and pieces. If you wanted to take it back out, SMP knew what had to be removed and could do so. When a problem occurred and IBM had a fix for it, SMP would tell you if the fix was already in place, and it could install it if necessary. When a new version of a piece of software came out, SMP could install it and remain ready to back it out.

This approach has many advantages. Many software bugs cause problems for only a few people. If you are one of the few, SMP could install the fix. If you weren't affected, SMP could store the fix in case you needed it later, and by not installing it you avoided a change that could cause another problem. IBM would also store up bunches of fixes and release a Program Update Tape, and periodically you could bring your system up to the current maintenance level. Your system software could be tailored to your needs, and you could pick and choose what maintenance you wanted.

In the Macintosh world, software updates are simpler: You get a complete replacement for a piece of software. All bug fixes are included, whether they affect your configuration or not. If a program has to be changed to work on a Mac II, the Mac Plus and SE owners get the same changes. If you are having problems with System Software 5.0 and need a bug fix that's in System 6.0, then you have to go all the way. And if there's a change in System 6.0 that causes a problem in another program, then you have to update it too.

Apple has made some progress in simplifying system updating with its Installer program. By using the appropriate script for your machine, only the resources you need are placed in your System folder and System file, and your fonts and desk accessories are left intact. Something as complex as SMP would be too difficult to use for many Macintosh owners, but Apple needs to do something more than the Installer, and it needs to be useful to third-party developers. In the meantime, most Macintosh users will stumble along, and corporate users will need a support person to keep track of versions and updates.

BIG PROBLEM #5: BUDGETS OUT OF CONTROL

The one problem that every user of computers eventually runs into is the out-of-control budget. Computers are almost like an addiction, with a constant urge to go faster or add memory or increase disk space. Books have been written on how to control data processing budgets. In the seminal

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work on the subject, "The Stages of DP Growth," which originally appeared in the *Harvard Business Review* and has been widely published and updated, Richard Nolan identified several stages of growth (originally three, then four, then six). In the early stage, the budget grows steadily as the early adopters and technophiles bring equipment and software in. When the value of the technology becomes apparent, everyone wants it, and the explosive, out-of-control growth begins. Then comes the control phase, where management clamps down and forces the growth to slow to a crawl, until things get sorted out enough for the next phase, which is a controlled growth of the budget.

In most companies, the mainframe group has been through all these stages and has finally gotten its data-processing budget under control, reined in while still galloping along. But just when they got things well in hand, along came microcomputers, and the battle moved from the DP budget at the company level to the computer component of departmental budgets. And guess what? The stages repeat themselves in the microcosm of the department.

The Macintosh fits rather oddly into this scheme of things in many companies. These companies have already gone through one or more stages at the departmental level, but with the IBM PC as the main budget problem. These companies often handle the later, controlled phases by buying lower-priced clones to get more bang for the same buck. When the Mac gets into the act, even companies with a good grip on their budgets can get back into trouble. The Macintosh can be expensive, especially if companies try to stay at the leading edge of technology. And the Macintosh doesn't have clones, so there is no budget pressure valve available that way.

The companies that will have the most trauma are those that never computerized at all and that don't have the mainframe experience to help them even a little. The first realization that the budget has gotten out of control can come as a real shock to these companies, and can cause real problems

depending on the levels of expenditures.

Those are the five big problems that mainframe people have experienced and for the most part solved, and that Macintosh people are experiencing now or can expect to experience. Unfortunately, there's not a lot you can do about some of these problems except wait for Apple and third-party developers to solve them for you. But forewarned is forearmed, and you can start to prepare yourself to deal with these problems. They're coming.

When the value of the technology becomes apparent, everyone wants it, and the explosive, out-of-control growth begins.

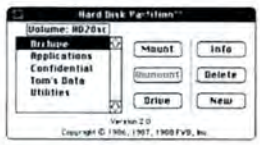
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One of the big problems discussed last month was losing data. Backups, no matter how frequent, are just a "snapshot" of your data at one point in time (and often several days old). The other day I accidentally deleted from my hard disk a folder containing other folders that added up to more than 10 megabytes of data. And, you guessed it, my backup was over a week old and many of the files had changed since then. I had that horrible sinking feeling that I hope you have never experienced.

But there was a glimmer of hope, because I had recently received and installed the Symantec Utilities for Macintosh. So I quickly ran SUM's Disk Clinic application and tried the Undelete File option. I had installed SUM's Guardian facility, so I hoped the files could be found. Disk Clinic did find several files I had deleted, but

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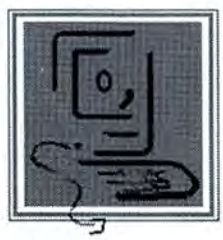
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not the ones I wanted because the whole folder was gone. That's because the files themselves weren't deleted, only the folder's directory was erased. The effect was the same, but left SUM with an impossible task. Or so it seemed.

Since I knew Guardian had recorded the state of my hard disk the last time I shut down, and that the folders were there then, I simply turned the power to my Mac off, being very careful not to shut down (see note following) and tried Disk Clinic's Recover Crashed Disk option. And when it was done (in less than 4 minutes total time), the folders and their contents were restored! (Very important technical note: The Guardian writes its files at shutdown time, so if I had shut down at any point before the recovery, the new state of the volume, without those folders, would have been saved.)

Recreating the files in those deleted folders would have taken me several days. Since SUM costs less than $100, it paid for itself right then and there. I can't recommend Symantec Utilities for Macintosh highly enough. Buy it. But remember, you still have to back up your disks. There are some problems SUM can't help you with. But in conjunction with a good backup procedure, SUM makes your data a lot safer.

PINSTRIPE PICKS

Some products recently released or upgraded that are worth looking into if you use your Macintosh in business:

PowerPoint 2.0: (Microsoft) An update to the first desktop-presentation program that adds many enhancements, including support for color.

Symantec Utilities for Macintosh (SUM): (Symantec) An indispensable set of utilities to protect and recover data.

FileMaker 4:(Nashoba) A new multiuser version of the popular and easy-to-use database program.

Pixel Paint 1.1: (SuperMac) Minor revisions to the powerful color painting program. This upgrade necessary to work with new Apple System Software 6.0.

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The Mac brought art to the business world. It also helps the art world get down to business.

The Mac has brought a touch of the artistic to all those drudge tasks that computers get stuck with. In the post-Mac world, memos can be fun. Finally, a computer that lives by the creed, "We are all artists, even when we're just writing up inventory memos." On the Mac, constructing a spreadsheet can be as aesthetically satisfying as completing a crossword puzzle. Newsletters have become an art form unto themselves. We Macophiles live in a world of application software as art.

But some folks were painters even before MacPaint, performers before Performer, page makers long before PageMaker, and video workers way before VideoWorks. And the Mac hasn't ignored them.

PRO CREATIVE

Artists in every discipline have been drawn to the Mac just as strongly as the memo-writers and spreadsheeters. The Mac has struck a chord among musicians, created a big hit in Holly-



wood, and provided a home for the muses of sculptors, fabric designers, illustrators, dancers, poets, and more. Marlon Brando reportedly has eight Macs (application unknown). There's even a journal of personal computer aesthetics (called *Verbum*) featuring stunning graphics, much of which come from the Mac.

Many artists use conventional software tailored to their needs. A theatrical designer I know uses Excel for lighting and sound-effect cue sheets, for example. For craftspeople and three-dimensional artists, the Mac can help plan and visualize a work; CAD/CAM and 3-D modeling packages that might have been intended to design widgets also make great tools for sculptors. And at least one science-fiction writer is using simulation software to help keep his facts consistent and to generate ideas about life in his artificial worlds (see sidebar, "Surreal Port"). And artists also use mainstream commercial software to handle the inevitable business end of art, freeing more time for creativity.

There is also a wide variety of specialized software designed specifically for artists. There are storyboarding tools for screenwriters, screenplay word processors for screenwriters, music-notation applications for musicians, graphics tools designed for comic-book artists, and so on.

And there is also software designed for the specialized electronic hardware that now dominates many artistic disciplines. There are sequencers for recording bravura musical performances, HyperCard videodisc

BY JON ZILBER

interfaces for multimedia artists, and SMPTE synchronization utilities for film production.

LET'S GET GRAPHIC

Let's start simply, with tools for graphics artists. Most of these are aimed at business and commercial applications, not fine arts. Some artists have shied away from the Mac because they think everything will come out looking bit-mapped or reminiscent of a pie chart. As with any medium, there are certainly some styles for which the Mac is less suited than others, but the combination of PostScript illustration and Linotronic output offers artists a huge range of styles.

A more serious limitation has been color. Color is a relatively new concept for the Mac, but there are now a good selection of tools for display and output. Look for the MacUser Labs report on color monitors ("True Colors") and the review of two hot color printers ("Here's Looking at Hue") in this issue. However, these tools are still pricey and are likely to be used mostly in service bureaus — which makes them viable as production tools but not for the fine arts.

For moving pictures, things are even further behind, though the future holds equal promise. For video and film, the Mac is primarily an organizational tool — something to put all the pieces together. For example, you can take graphics created on or scanned into a Mac, combine them with text, format them appropriately, and you've got yourself a storyboard. "The Producers," in this issue, takes a look at what's available for filmmakers.

But you can't really use the Mac to generate, store, or process the actual footage — the thousands of individual frames of images. There's simply too much data in a frame of visual information (with the kind of resolution we've come to expect) to make this feasible — with one exception: object-oriented animation.

Programs like MacroMind's VideoWorks II have been enormously popular for artists creating animation. Two new utilities make the program even more powerful. The VWII HyperCard Driver lets you import color animation (including sound) into your stacks. And the VWII Accelerator lets you "compile" animation sequences to speed up the replay to at least 30 frames per second — comparable to film and video output. MacroMind has also released Clip Animation, Clip Sounds, Clip Charts, and Black & White Movies, ready-to-use components that you can incorporate into your own animation.

And MacroMind has a new package for the pro, due out by about the time you read this, called (of all things) VideoWorks Pro (expected list price: $695). It goes beyond the earlier versions with a host of features, aimed at professional multimedia production. It has a revamped user interface and incorporates much of the functionality of still-graphics programs like PixelPaint while adding text and commenting capabilities that make the program suitable for storyboarding. It also adds color cycling and manipulation features, enabling each frame to have its own palette of colors. It will also include clip animation to make it easy to create presentation charts and point-of-purchase displays. You just enter your text, select options such as whether you want the text to enter the frame

Gonna Take a SMPTE-MIDI Journey

It's Monday morning, 9 A.M.. Somebody hands you a film or videotape and says, "I need music for this. Write some now." You know how to write music (I pretend that all the time about myself), but you need some way to match your musical ideas to the action on the screen.

And then that same somebody says, "Oh, and by the way, I need you to put some tire squeals in the chase sequence, and I want a great big explosion when the car hits the outhouse. You're gonna love this script, babe!"

I hear you; you're saying, "Yes indeedo, that happens to me all the time. What the heck do I do? I have all these great musical ideas, but how do I get them to synchronize to this darn picture? And how do I get the sound effects to match events exactly? There ought to be some way to use a Mac to make this easier."

WHAT'S IT ALL ABOUT, MIDI?

Let's start with a digression into the world of MIDI, SMPTE time code, and MIDI time code. MIDI, which stands for Musical Instrument Digital Interface, is a term used to describe a special serial protocol for communicating between music-controlling devices (MIDI-equipped keyboards, guitars, violins, drum pads, woodwind controllers, or even tap shoes); sound-generating devices (synthesizers, samplers, drum machines, or MIDI player pianos); and, yes, computers. MIDI can also talk to audio mixers, signal processors (equalizers and reverbs), and even lighting consoles. For the sake of brevity, let's call music-controlling devices *keyboards*, sound-generating devices *synths*, and computers *Macs*.

Using MIDI, you can plug a keyboard into one or more synths, play, and the synths will play music (depending on your skill). The keyboard may even have a synth built in, but you can also control other synths. You can record your performance on your Mac, using *sequencing software*. The Mac can later play it back into any combination of synths. Whether the information is coming directly from your fingers or from the Mac playing back the sequenced recording of your finger motions, the synths will sound the same.

Recording a performance on a computer allows a musician to edit that performance and make it exactly what was intended. That's like Paganini being able to play a virtuosic piece, step outside of himself, and have his old self play exactly what he just played at any tempo (with or without changing the pitch). He could then move the fingers and adjust the bowing of his old self to perfection, fine-tune the tempo, and have his old self record the edited version onto tape.

You're probably starting to see that, if Paganini were alive today, he could sequence his film/video soundtrack on his Mac, adjust the tempo after the fact to match the picture, and sequence a violin smashing to create the sound of the car hitting the outhouse.

But how would his Mac know when to trigger the violin smash, and how would it know when to start the music or how fast to play it?

AND THEN ALONG CAME SMPTE

SMPTE stands for the Society of Motion Picture and Television Engineers, an organization that works hard to create standards in these fast-changing technological times. But it's not *that* SMPTE that we want here; it's *SMPTE time code* that matters to us. SMPTE time code is a way to give each frame of a video or film its own unique numerical name. People usually end up calling it SMPTE (pronounced *simp-tee*).

Say, for example, that you're writing music to a videotape and you want to have a saxophone play the obligatory sultry note when the actress playing the obligatory love interest walks up to the obligatory car (just before the obligatory chase scene). It's very important to know at which frame her walk begins. You might even want to know the frame numbers of all her footsteps so you could write your music to match the tempo of the walk. SMPTE is invaluable for this. If you're lucky, on some film projects the music editor will give you feet/frame numbers for the same purpose.

Each footstep is referred to as a *hit*, and the whole scene is called a *cue*. Hits are frames you want to fall on a beat, or frames where you need to trigger an appropriate sound effect.

Each frame is labeled with an hour, minute, second, and frame number, with two digits for each. It looks like a digital stopwatch, with an extra space for frames. The number of frames per second (FPS) can be 30 for video; *almost thirty* (or *drop frame*), also for video; 25 for video in some other countries; and 24 for film.

Every few minutes, drop code skips a few frame numbers to conform to real time. Drop-frame time code gets used a lot because it does conform to real time and because it's handy to look at the time code numbers and know exactly how far into a show you are.

Why is it that regular time code of 30 frames per second doesn't conform to real time, you ask? SMPTE's timing is derived from video color frequency, which turns out not to be an even division of 60 hertz; it's just the way the math works out. Life is strange.

SMPTE can be recorded as pulses called longitudinal time code (LTC) on any spare audio track of an audio or video tape. It can also be recorded in the vertical interval (between frames) of a video picture as a signal, called appropriately enough, vertical interval time code (VITC). LTC works at high tape shuttle speeds; VITC doesn't, but it has the advantage of being able to tell the world where a tape is when the tape is moving very slowly or is stopped (very useful when you want to stop a video on a hit frame and write down the time-code number).

Time for a quick jargon check. Repeat after me: keyboard, synth, Mac. Good. Now try: MIDI, sequencing, SMPTE, hit, cue, FPS, LTC, VITC. Did you say, "Mid-ee, sequencing, simp-tee, hit, cue, frames per second, el tee see, and vit-see"? Excellent. You're becoming an expert.

— Jamie Krutz

from the left or right, set a tempo, and watch the result.

MEASURE FOR MEASURE

Among the fine arts, the discipline in which the Mac has made the most headway is music. Musicians use Macs for everything from performance to composition to recording. According to one estimate, half of all the music the average listener hears today passes through a computer at some point. And, despite Apple's initial hesitation in pushing Macs in music, the Mac has become the computer of choice among musicians.

Combined with technological strides in multitrack recording, MIDI-based software has made it possible for your Mac to become the hub of a basement or professional recording studio. MIDI is a data standard that provides a way to seamlessly combine outputs from almost every make and model of synthesizer with the power of computer processing. (MIDI newcomers should take a detour past the sidebar "Gonna Take a SMPTE-MIDI Journey" for an explanation of MIDI and its video cousin, SMPTE. The sidebar "Side By Side" tells how you can get MIDI and SMPTE to work hand in hand. For a more detailed tutorial, dig up the June '88 issue of *Keyboard* magazine, which featured an excellent "Back to Basics" package that will get you up to speed on the musical terms and practices. And for some historical perspective, *Electronic Musician* did a wonderful look backward in their July '88 issue on "20 Great Achievements in Twenty Years of Musical Electronics.")

Another reason computers have had such a visible (er, audible) impact in music more than other arts may be that the Mac's current level of technology is just good enough to handle the *bandwidth* — the amount and complexity of information — inherent in music; they can, for example, record the stream of notes coming off a rack of synthesizers using MIDI sequencers. (MIDI data rates aren't always enough, though. If you want the gritty details, look up "The Dysfunctions of MIDI" in the Spring '88 issue of the *Computer Music Journal*.)

There are different theories on how MIDI came about. Some say that the synthesizer manufacturers had the foresight to plan ahead for connectivity between musical instruments, computers, and other hardware (like mixers, lighting controllers, and video equipment). Others say that MIDI came about because rock keyboardists were grumbling that they wanted to be able to control a rack of hardware from a remote portable keyboard light enough to strut around the stage with, like a guitarist. In any case, MIDI happened, and a world of possibilities opened up.

To enter that world, you'll need to invest in a synthesizer. Prices range from a few hundred dollars to more than you'd care to think about. While you're shopping, bear in mind that the third-party software packages developed for some synths sometimes lean toward a particular computer — Roland software leans toward MS-DOS, while Yamaha has been more closely associated with the Mac camp (although Yamaha has just come out with its own C1 computer, a powerful MS-DOS-compatible laptop with 11 built-in MIDI jacks). A Mac is featured prominently in ads for E-mu and

Kurzweil samplers (E-mu even has a sampler called the Emax SE). But there are no hard and fast lines. Mac software is available for nearly every synth on the market. (Incidentally, if you're not a keyboardist, there are also MIDIfied guitar, wind, mallet, and percussion controllers — even voice-tracking devices that convert your voice to a MIDI signal.)

I'VE GOT MIDI

Now all you need is software. If you're a performer, the first thing you'll want to look at is sequencers. Sequencers record all the MIDI output of a synth. Many of these use a tape-recorder metaphor — you can record, play back, fast forward, and rewind MIDI tracks. But they also let you edit MIDI "events" (a note being hit or released, the velocity with which it was hit, the use of a *controller,* such as a sustain pedal or pitch-bend wheel, and so on) with digital accuracy.

Sequencers don't record the music; they record the sequence of events, which can be played back through your synth. You can record using one synth and play back on another. That means you can work out all the tracks on your composition in your basement MIDI studio using a $500 Casio synth — and then hand the disk over to a pro studio that can produce the final output on a $10,000 Kurzweil sampler or a $200,000 Synclavier system.

Several new sequencers are in the works, but hadn't yet been released in time for this issue. (For an idea of what's available, check the directory at the end of this article.) New versions of Passport's Master Tracks Pro and Opcode's Sequencer are due out shortly. Also, keep an eye out for Level II, from Dr. T's Music Software, an old-timer on other computers but a relative newcomer on the Mac. It has features like macro generation, note mapping (useful for translating one drum machine into another), and blending functions for smoothing out discrepancies in rhythms, velocities, and durations among tracks. It also lets you algorithmically edit tracks to create variations on a sequenced theme. Another new sequencer is One-Step from Southworth. It emphasizes a palette of tools (rather than menu choices), the use of color, the ability to stretch time to fit SMPTE hit lists, and varying levels of quantization. (We'll be reviewing the new crop of sequencers in the near future.)

Side by Side

When we left Mr. Paganini, he understood what MIDI and SIMPTE are and what they do, but what can he do with them? Wouldn't it be nice if Paganini could send SMPTE down a MIDI cable into his Mac, so the Mac could "watch" each frame of the video as it goes by? That way, with the appropriate software, Paganini could tell the Mac exactly where he wants sound effects triggered. The Mac could patiently look at each SMPTE frame number as the video plays; when it sees one he's told it about, it could send a MIDI signal to a synth or sampler to trigger a perfectly timed sound effect. The right software could also assist Paganini in finding the tempos that work best with each scene, given a starting time and time-code numbers of relevant hits (like the footsteps).

A little over a year ago, SMPTE and MIDI were married into something called MIDI Time Code (MTC). A piece of hardware (like Opcode's Timecode Machine) reads SMPTE, translates it into MTC, and sends it to the computer (via a MIDI interface). Developers of sequencing software are moving to support MTC, and a new breed of software has appeared to help composers and sound-effects editors as they create soundtracks for pictures.

I'VE GOT RHYTHM

The first of these programs to appear was Opcode's Cue. Digidesign followed with Q-Sheet, and recently Passport joined in with ClickTracks. ClickTracks is the simplest of the three. Though it doesn't lock to MTC, it lets you enter hit points into a hit list by typing them in. If the video you're working with doesn't have SMPTE codes on it, you can use the Stopwatch function to time cues. A Tempo Tap feature lets you tap a tempo as you watch the picture.

After you've entered the hit points, you can use the Scan function. Define a starting time and give the program a range of possible tempos and how close to a beat you'd like the hit points to be, and the program will let you see which tempos work best.

When you've settled on a tempo, you can call up a hit map, which graphically shows beats and hit points. You can make changes on the hit map and print it out. The hit list and the "conductor" can also be printed. The conductor shows tempo and meter changes.

ClickTracks deals with all four kinds of SMPTE, as well as feet/frame formats for 16-, 35-, and 70-millimeter film. A tempo convert function translates between any SMPTE and film format.

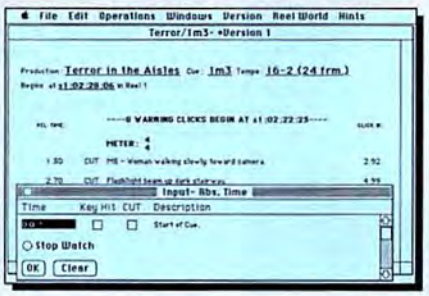
Film composers used to have to refer to page after page of numeric charts to figure out likely tempos in tomes called click books. ClickTracks has a click book built-in, should you need it. When you have come up with a tempo or range of tempos you like, ClickTracks will save them as a standard MIDI file for use in your sequencer. The file includes meter/beat/tempo and hit information. Once you've imported it into your compatible sequencer, lock the sequencer to the picture and write your music. Your sequencer must support the standard MIDI file format and MTC to accomplish this. ClickTracks can also dump a tempo map into a Roland SBX-80 or Southworth Jambox, for control of a sequencer through MIDI song pointer (if you don't have an MTC compatible sequencer).

AND THE BEAT GOES ON

Opcode's Cue has many of the same functions as ClickTracks, though some are more flexible, and it also has some unique features. There is a cue list for entering hits (all types of SMPTE/film formats), a stopwatch, a click book, a Tempo Tap feature, and a Tempo Search function for calculating tempos to match hits to beats.

Sometimes you want to mark events just for reference without writing music around them, and Cue lets you do that. You can also adjust how closely you need the cues to fall on beats, but with separate tolerances for each side of the beat. Cue can even handle accelerandos and ritardandos.

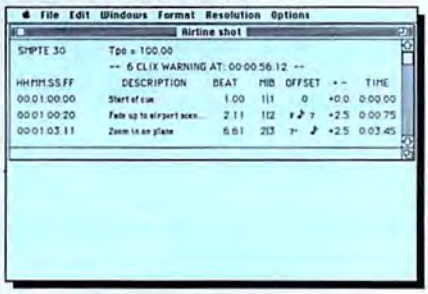
Digital samplers have come way down in price and are giving synthesizers a run for the money. Samplers store actual digitized sounds for sampling, rather than creating a purely artificial sound from scratch. It's analogous to the difference between scanning a photo and creating a PostScript graphic; both approaches have their strengths



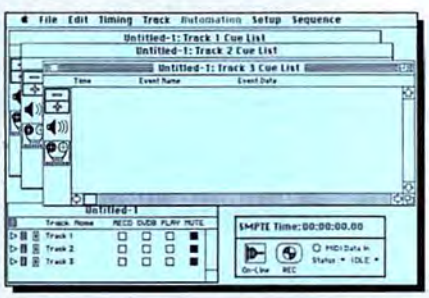
Opcode's Cue lets you enter hit points in the Cue Sheet window.



Puttin' on the hits is easy — Opcode's Cue marks them on the printed score.



Passport's ClickTracks displays hits in a Hit List window.



Digidesign's Q-Sheet lets you draw your own controls for MIDI automation.

The program can synchronize to tape or film via MTC, and it can trigger synth and sampler effects on up to 40 different MIDI note numbers for laying in sound effects directly. The MTC lockup also lets you use the tempo tap feature to create tempos on-the-fly as you watch the video. The program can be set to average out minor inconsistencies in your tapping.

Cue can also generate a performing rights list documenting how much music you've written (for royalty purposes). In the playback mode, a *streamers and punches* display provides visual feedback of hits. Special hardware is available to superimpose this display onto video, which is helpful when conducting a live ensemble.

An on-screen Clicks window shows a timeline display of click number, measures, beats, hits, and time. You can print out your work in the form of blank score paper (up to 12 staves), with the tempos, time signatures, and hits marked. Cue can output standard MIDI files or dump a tempo map via MIDI system-exclusive commands to SMPTE boxes like the Roland SBX-80 and the Southworth Jambox.

A DIFFERENT DRUMMER

Like Cue or ClickTracks, Q-sheet will let you enter hits into a hit list, but it's really a different animal. Q-Sheet won't help you figure out tempos for music. It's a standalone tool for synchronizing sound effects to the picture. While it's doing that, Q-Sheet has the added ability to automate your mixer, synth changes, and signal-processing devices.

Instead of exporting standard MIDI files to a sequencer, Q-Sheet is itself a sort of sequencer. It will lock to MTC, play in sync with the picture, and trigger events from the list. An event could be a single note to trigger a sound effect on a synth or sampler (notes can be entered directly from a MIDI keyboard), or it could be a complete sequence created on another, more music-oriented sequencing program and imported into Q-Sheet. To save time when working with video, Q-Sheet can also import a CMX-compatible edit-decision list from some video-edit controllers.

Q-Sheet can import standard MIDI files, or it can capture sequences in real time from sequencers that don't yet support the MIDI file standard (including sequencing software running on computers other than a Mac).

Q-Sheet's automation capabilities are amazingly flexible. The program allows you to design your own control panels by drawing knobs, faders, and buttons. You can assign them to any MIDI controller or switch numbers. Unlimited subgrouping is supported. Using your own or a supplied panel, you can click on buttons or slide faders with the mouse to control your MIDI devices. Your button clicks and fader moves are recorded by Q-Sheet and played back in sync to the picture. If you have a MIDI-controllable mixer, you can completely automate your mix. The ability to trigger sound effects while automating your entire MIDI studio lets one Mac do the job of two.

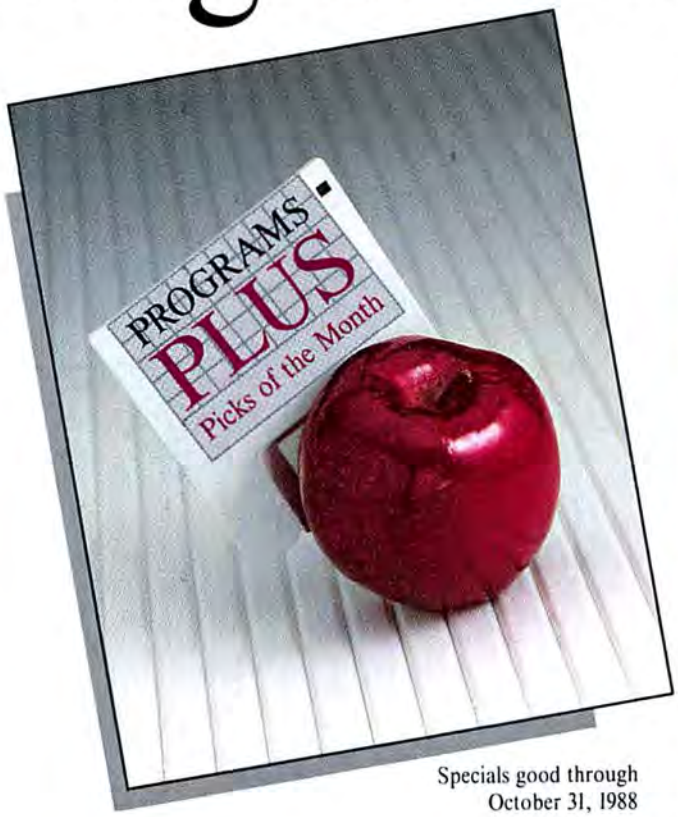
An enhanced version of Q-Sheet, called Q-Sheet AV, sports these additions: the ability to import a CMX-compatible edit-decision list from some video-edit controllers; enhanced automatic event generating, for background or repeated sounds; and a printable track sheet for manual mixing.

A ONE, AND A TWO, AND A THREE

ClickTracks can be very helpful in figuring out timings and tempos for exporting your decisions to a sequencer for further work. Cue adds the abilities to trigger sound effects directly, generate a performing-rights list, print marked music paper for composing, and display a streamer/punch display on playback. Q-Sheet can handle a complete sound-effects session while doing total MIDI automation. These are the kinds of programs the Mac was meant for. They handle the drudgery, leaving you free to be creative.

— Jamie Krutz

Programs & Peripherals



Specials good through
October 31, 1988

Turbo Trackball by Asher Engineering



The inherent drawbacks of the mouse are elegantly solved with the new ***Turbo Trackball***. The two-button *Turbo Trackball* is sculpted to fit neatly alongside your keyboard and leave the rest of your desk free. The ball mechanism provides smooth and precise control, and a button lock feature allows you to pull down menus and drag items with ease. Everything that the mouse can do can be done quickly and easily with the *Turbo Trackball.*

Turbo Trackball **69.**

MacKids Educational Programs by Nordic Software

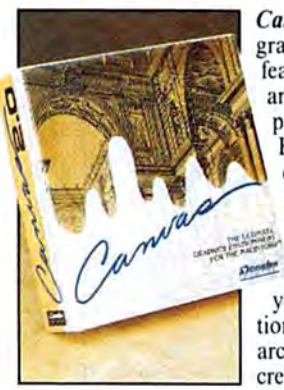


MacKids is a complete series of twelve quality educational software products for the Mac specifically designed to teach and entertain kids. Whether your children are preschoolers or young adults, there's a *MacKids* package that will give them the learning edge.

Preschool Disk 1 (3-7), Preschool Disk 2 (3-7), CoinWorks (4-12), ClockWorks (4-10), Early Elementary 1 (6-9), Lemonade Stand (6-16), FlashWorks (6-adult), Naval Battle (6-adult), Word Search (6-adult), Alphabetizer (7-adult), EarthWorks (10-adult), or BodyWorks (10-adult).

Each Program **28.**

Canvas 2.0 by Deneba Software



Canvas 2.0, one of the top graphics programs in use today, now includes many new features. Some of the enhancements include: an unlimited number of layers, precision positioning to 1/64,000th of an inch, Bezier curves and polygons with unlimited control points, and 16.7 million colors on the Mac II. Auto-Tracing converts existing bit mapped images into true objects. As you can see, *Canvas 2.0* now rivals dedicated CAD programs. Whether you use it for business graphics, presentations, desktop publishing, engineering or architecture, *Canvas 2.0* will stimulate your creativity.

Canvas 2.0 **165.**

Desk Accessory Programs

Affinity Microsystems Tempo II	89.	**Greene, Inc.** QuickDex 1.4A	32.
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Beyond Inc. Menu Fonts 2	32.	Smart Alarms & Appointment Diary	35.
Borland SideKick V2.0	59.	**Mainstay** Think'n Time	61.
CE Software DiskTop 3.0	28.	**Olduvai Software** DA-Switcher II	25.
Deneba Software Comment 2.0	54.	**Solutions, International** Super Glue	52.
Electronic Arts Disk Tools Plus	31.	SmartScrap & The Clipper 2.0	52.
Exodus Software Retriever	59.	**Symmetry** HyperDA *(Req. 512K)*	38.

Languages

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Turbo Pascal Numerical Methods	65.	Microsoft Basic Compiler	125.
Turbo Pascal Tutor	45.	**Smethers & Barnes** Prototyper	75.
Consulair		**Symantec** Lightspeed C	95.
Macintosh 68000 Development System	59.	Lightspeed Pascal	65.
Insigna SoftPC	489.	**T.M.L.** T.M.L. Pascal II	
Mainstay V.I.P. 2.5		*(Includes MPW)*	79.
(Visual Interactive Programming)	109.	T.M.L. Source Code Library II	49.

Utility Software

ALSoft Disk Express 1.10	26.	**Olduvai Software**	
Font/DA Juggler Plus	32.	Icon-It! or MultiClip	39.
Berkeley System Design		Read-It! TS *(For Thunderscan)*	79.
Stepping Out II	54.	Read-It! O.C.R. *(For Image Scanners)*	199.
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Infosphere Liaison	129.	myDiskLabeler w/Color	31.
LaserServe *(LaserWriter Print Spooler)*	62.	myDiskLabeler w/LaserWriter Option	34.
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Microseeds Redux	65.	Findswell 2.0 *(Document Finder)*	36.

Communications Software

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Compuserve Starter Kit	24.	**Hayes** Smartcom II 3.0	88.
Grolier On Line Encyclopedia	32.	**Palantir** InTalk V3	119.
Compuserve Navigator	45.	**Software Ventures**	
DataViz MacLink Plus with Cable	145.	Microphone II *(Includes Glue)*	225.
Dow Jones Desktop Express	95.	**Traveling Software** LAP-LINK	85.

to Polish Up Your Mac...

Deluxe Macplus-XKB Case by Targus



Macintosh users value the portability of their machines, and Targus has provided a stylish way to carry your Mac. The ***Deluxe Macplus-XKB case*** is made for the Macintosh/Plus/SE and the extended keyboard. This unique bag conveniently houses the keyboard in a separate, removable case. The rugged outer-shell is made from treated 840-D nylon. Full 1" foam padding protects your valuable equipment. The case includes a large exterior pocket for miscellaneous items such as manuals. A portfolio section includes disk pockets, mouse and cable pockets, as well as pen and business card holders. Padded handles and shoulder strap allow you to transport your Mac in comfort.

Deluxe Macplus-XKB case **65.**

Where in the World is Carmen Sandiego? by Broderbund



Where on Earth will you find the excitement of international travel combined with the intrigue of cloak and dagger sleuthing? In your Macintosh —when you boot up Broderbund's ***Where in the World is Carmen Sandiego?*** As an Interpol agent you'll use clues, police dossiers, a computer database, and the World Almanac (the folks at Broderbund include this useful reference with the program) to pursue the world's most notorious criminals! This award-winning educational game teaches children (age 12+) geography and culture, and helps adults sharpen their reasoning skills. Lively graphics, animation, and sound maintain excitement. Combinations of 30 cities, 30 criminals, and 1,000+ clues assure new challenges every time you take a new case!

Where in the World is Carmen Sandiego? **25.**

CommLink 2400 Modem by MDIdeas



Give your telecommunications a boost with the high-performance ***CommLink 2400*** external modem. Although it is small in size (same as the Apple 3.5" drive), it has a surplus of features. Operating at 0-300/1200/2400 baud, it supports Hayes "AT" commands and "S" registers, and works with all Hayes compatible communications software. Digital signal processing and VLSI technology ensure reliable and clean data transfer. Save time with auto-dial/ auto-answer modes, and monitor calls on-screen or with the internal adjustable-volume speaker.

CommLink 2400 **179.**

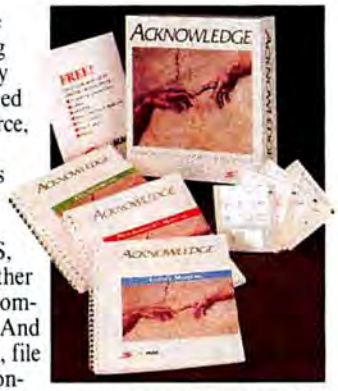
MacSnap Internal Memory Expansions by Dove Computer Corporation



It's a safe bet that no matter what Macintosh model you have, Dove Computer has a ***MacSnap*** memory expansion product that matches your needs. That's because Dove has an extensive line of high quality memory and productivity enhancement products available. All Dove products are easy to install and represent a superior value! We've selected some of the most popular models, and are offering them at special prices. All models listed include Dove's RamSnap software, their intelligent ram management software.

MacSnap 2SE **475.**
MacSnap 524E **265.**
MacSnap 524S **409.**
MacSnap 548E **585.**
MacSnap 548S **649.**
MacSnap Plus 2 **475.**

Acknowledge by SuperMac Software



Acknowledge enables you to create telecommunications systems linking virtually every user to any data they need, allowing them almost unlimited access to your most valuable resource, information. With *Acknowledge* Custom Information Systems, users can access mainframes, PCs, other Macintoshes, and communications devices running AppleShare, TOPS, InBox, and Microsoft Mail, plus other LAN products — geography and compatibility are problems of the past! And because it's Multifinder compatible, file transfers and program execution continue while individual users work in their applications, increasing staff and system efficiency. *Acknowledge* includes TAL (Telecommunications Access Language — a new user-friendly programming language), AckEdit for creating custom dialogs, a menu construction tool, and support for creation of custom help files and icons.

Acknowledge **359.**

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MacSnap 524 *(512K to 1MB)* 325.
MacSnap 524E *(512E to 1MB)* *Special* 265.
MacSnap 524S *(512E to 1MB w/SCSI)* *Special* 409.
MacSnap 548 *(512K to 2MB)* 599.
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MacSnap Plus 2 *(MacPlus to 2MB Non Expandable)* *Special* 475.
MacSnap 2SE or 1024 Option *(1 MB Acc. or MacII Memory Exp.)* *Special* 475.
SCSI Interface/Port 129.
MacSnap Toolkit *(torx driver, opener & grounding set)* 15.
Everex Emac 20D *(20Mg Hard Disk)* 520.
Emac 20 Deluxe 585.
Personal Computer Peripherals
Beige or Platinum Color. Optional Built-In Modems Available.
MacBottom HD-21 *(20+MB SCSI Hard Disk)* 749.
MacBottom HD-32 *(32MB SCSI Hard Disk)* 879.
MacBottom HD-45 *(45MB SCSI Hard Disk)* 1139.
MacBottom HD-70 *(70MB SCSI Hard Disk) Plat only* 1395.
Rodime Rodime 20 Plus Ext. 629.
Rodime 45 Plus *(Ext. 45MB SCSI)* 939.
Rodime 450RX *(Int. 45MB Mac SE/II)* 829.
Rodime 60 Plus *(Ext. 60MB SCSI)* 1039.
Rodime 100 Plus *(Ext. 100MB SCSI)* 1169.
Rodime 140 Plus *(Ext. 140MB SCSI)* 1319.
Rodime 1000 RX *(Int. 100MB MacII)* 1045.
Rodime 1400 RX *(Int. 144MB MacII)* 1669.

Printers & Digitizers

AST Research TurboLaser P/S 3559.
TurboScan *(Sheetfeed model)* 1199.
TurboScan *(Flatbed model)* 1329.
Koala Technologies Corp.
MacVision 2.0 *(Digitizer)* 225.
Kurta IS ADB Tablet 259.
Cordless 4 Button Cursor 99.
Seikosha SP1000 *(Imagewriter Comp.)* 229.
Summagraphics Bit Pad Plus 335.
ThunderWare ThunderScan V4.0 with Power Port 199.
Mac II Power Accessory 42.
Video Technology
Laser 190 A (Imagewriter Compatible) 249.

Accessories

Abaton ProPoint *(ADB TurboMouse for Mac SE & Mac II)* 99.
Asher Engineering
Turbo Trackball *(Mac & Mac+ or Mac SE & Mac II)* *Special* 69.
Beeh-Tech
Fanny Mac *(Beige or Platinum)* 65.
CH Products Mach IV Plus: Quad or ADB 65.
Mirage: Quad or ADB *(Turns Joystick Into Mouse)* 39.
Curtis Manufacturing
Emerald-Surge Suppressor-SP-2 36.
Ruby-Surge Suppressor-SPF-2 55.
Cutting Edge Cutting Edge EADB-105 Keyboard *(Mac SE & Mac II)* 135.
DataDesk MAC-101 Keyboard/Beige *(128k/512k & MacPlus)* 139.
MAC-101 ADB Keyboard/Platinum *(Mac SE & Mac II)* 139.
Ergotron
MacTilt or MacTilt SE *(Platinum Color)* 68.
Farallon MacRecorder Sound System *(Mac SE or Mac II)* 145.
I/O Design
Mac Luggage in Navy or Platinum Gray
Macinware Plus Carrying Case 64.
Macinware SE Carrying Case 76.
Imageware II Carrying Case 49.
Kalmar Designs
Teakwood Roll-Top Disk Cases:
Micro Cabinet *(holds 45 disks)* 14.
Double Micro Cabinet *(holds 90 disks)* 23.
Triple Micro Cabinet *(holds 135 disks)* 32.
Kensington External Disk Drive Cover 8.
Extra Long ADB Keyboard Cable 25.
Macintosh II Stand 20.
Macintosh II Monitor Extension Cable 33.
Mouse Pocket *(Reg. or ADB)* 8.
Mouseway *(Mousepad)* 8.
ImageWriter or ImageWriter II Cover 9.
Macintosh Plus/SE Dust Cover 9.
Macintosh SE w/extended Kybd Cover 9.
Mouse Cleaning Kit w/Pocket 17.
Disk Drive Cleaning Kit 20.
Tilt/Swivel 22.
Apple Security Kit 34.
Antiglare Polarizing Filter 33.
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Modem/Fax Protector 20 29.
Power Tree Surge Suppressors (10, 20, or 50) Call
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Printer Muffler 80 43.
Printer Muffler 132 58.
System Saver Mac *(Beige or Platinum)* 64.
Super Base 34.
System Saver SE 62.
Masterpiece Mac II 119.
New Turbo Mouse *(Reg. or ADB)* 109.
Mouse Systems A+ Mouse *(MacPlus)* 65.
A+ ADB Mouse *(Mac SE/Mac II)* 85.
Moustrak MousePad 7"x9" Size 8.
MousePad 9"x11" Size 9.
Orange Micro Grappler C/Mac/GS 84.
Grappler L/Q 98.
Ribbons
Available in Black, Blue, Brown, Green, Orange, Purple, Red, Yellow, Silver & Gold
ImageWriter Ribbon 4.
ImageWriter Black 6-pack 20.
ImageWriter Rainbow Pack *(6 Colors)* 20.
ImageWriter II-Four Color Ribbon 9.
Silicon Comforts MacChimney *(Very Effective Cardboard Laminate Convection Cooling Device)* 16.
Smith & Bellows
Mahogany Disk Case *(holds 96)* 30.
Sopris Softworks
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Imagewriter II Case 49.
Macintosh Plus, SE w/Standard Kybd 59.
Macintosh SE & Extended Kybd Case 69.
Targus
Imagewriter II Carry Case Blk. 49.
Macintosh Plus Carry Case Blk. 59.
Deluxe MacPlus-XKB Blk. *Special* 65.

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Single Sided 3½" Diskettes
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Sony 3½" SS/DD Disks *(box of 10)* 13.
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Bulk *(Sony)* 3½" DS/DD *(10)* 17.
Centech 3½" DS/DD Color Disks *(10)* 19.
Sony 3½" DS/DD Disks *(box of 10)* 18.
Fuji 3½" DS/DD Disks *(box of 10)* 19.
Maxell 3½" DS/DD Disks *(box of 10)* 20.
Verbatim 3½" DS/DD Disks *(box of 10)* 19.
3M 3½" DS/DD Disks *(box of 10)* 20.

Modems

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AST
AST-2x2400 *(MacPlus/SE/II)* 625.
Epic
Epic 2400 Int. SE 315.
Epic 2400 Int. Mac II 315.
Epic 2400 Mini Ext. *(Hayes Compatible)* 155.
Everex
Emac 2400 Baud 225.
Hayes Microcomputing
Smartmodem 1200 299.
Smartmodem 2400 449.
MDIdeas
Commlink 2400 *Special* 179.
Migent
Migent Pocket Modem *(ext. 300/1200 Baud)* 115.
Novation
Novation Parrot 1200 109.
Practical Peripherals
Practical Modem 1200SA 109.
Practical Modem 2400SA 189.
MacCommpack *(2400SA w/Microphone & Cable)* 249.
Prometheus
Promodem 2400M Ext. *(Software & Cable)* 199.
Promodem 1200 *(Hayes Compatible)* 239.
Promodem 2400 *(Hayes Compatible)* 309.
Supra Corporation
Supra Modem 2400 149.
U.S. Robotics
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Ashton Tate dBASE Mac 1.0	295.
Blythe Software Omnis 3 Plus/*Express*	275.
Borland Reflex Plus	165.
Claris FileMaker 4	Call
Ducsoft, Inc. Applications & Routines for 4th Dimension Vol. 1	86.
Fox Software Fox Base Plus	214.
Fox Base Unlimited	259.
Ideaform Hyper Book Maker	31.
Microsoft Microsoft File	119.
Nantucket Software McMax	175.
Nordic HyperCONTROL	42.
Odesta Double Helix II	339.
GeoQuery	295.
Park Row Incorporated Publish or Perish	28.
ProVUE Development OverVUE 2.1E	149.
Software Discoveries RecordHolderPlus	45.
Telegraphics Hypertutor	30.

Business Software

Abacus Concepts StatView II *(Mac+, SE, II w/68020 & 68881)*	369.
StatView SE+ Graphics	229.
Access Technology Trapeze 2.1	159.
Ashton Tate Full Impact	319.
Borland Eureka! The Solver	129.
BrainPower ArchiText	185.
StatView 512 Plus	175.
Math View Professional	145.
DataScan	119.
Bravo Technologies MacCalc	79.
Chang Laboratories C.A.T. Contacts•Activities•Time	229.
Claris MacProjectII 2.0	395.
Cognition Technology MacSMARTS	135.
Legisoft/Nolo Press WillMaker 3.0	35.
Lotus Jazz 1A	189.
Lundeen & Associates WorksPlus Commands	60.
MacroPac International 101 Macros For Excel	44.
Mainstay Capture	38.
Mac Flow 2.0 or Mac Schedule	115.
Micro Planning Software Micro Planner 6.0	349.
Microsoft Microsoft Excel 1.5	249.
Microsoft Works 1.1 with Spellswell	189.
Microsoft Multiplan 1.11	119.
Owl International Guide 2.0	119.
Guide Envelope System	99.
Satori Software Bulk Mailer 3.2	79.
Bulk Mailer Plus	195.
Select Micro Systems, Inc. Exstatix or MapMaker	225.
Shana Enterprises Fast Forms	89.
Synex Mac Envelope	19.
Mac Invoice	32.
Systat Systat 3.1 *(Specify Mac 512k, MacPlus, or Mac II)*	459.

Word Processors & Desktop Publishing

Access Technology Mind Write 2.0	95.
Mind Write Express	149.
Allan Bonadio Associates Expressionist 2.0	79.
Aldus Corporation PageMaker 3.0	475.
Ashton Tate FullWrite Professional	275.
Claris MacWrite 5.0	119.
Letraset Ready, Set, Go! 4.0	279.
Microsoft Microsoft Word 4.0	249.
Microsoft Write 1.0	113.
Postcraft International, Inc. Laser FX	115.
Quark, Inc. QuarkXPress V2.0	499.
Symantec More 1.1C *(Color Version)*	175.
Symmetry Acta V2.0	42.
T/Maker Company WriteNow V2.0	105.
Word Perfect Corporation Word Perfect	185.

Spelling & Grammar Checkers

Aegis Development Doug Clapp's Word Tools	42.
A.L.P. Systems MacProof 3.0	115.
Deneba Software Coach Merriam Webster's Thesaurus 2.0	36.
Spelling Coach 3.0 *(Webster's/Medical/Legal/Hyphenation)*	54.
Spelling Coach 3.0 Professional	109.
Electronic Arts Thunder! 1.23	30.
Lundeen & Associates WorksPlus Spell 1.1	46.
Microlytics, Inc. Word Finder *(Synonym Finder)*	35.
Sensible Software Sensible Grammar	55.
Sensible Speller	45.
Working Software, Inc. Spellswell 2.0	42.
Lookup *(Makes Spelling Suggestions)*	29.

Accounting Packages

Aatrix Software Aatrix Payroll V3.0	115.
Aatrix Payroll Plus	189.
Bedford Software Simply Accounting	219.
Chang Labs *New Enhanced Version III Modules!* Rags to Riches 3-Pak 3.1 *(GL/AR/AP)*	289.
Professional 3-Pak or Retail Business 3-Pak	359.
Inventory Control 2.6 or Professional Billing 2.6	239.
Rags to Riches GL, AR, or AP	120.
Dac Software Dac-Easy Light	45.
Intuit Quicken	35.
Layered Insight One Write	189.
MECA Managing Your Money	129.
Migent In House Accountant	119.
Monogram Business Sense	279.
Dollars & Sense 4.0	81.
North Edge Software Timeslips III	119.
Peachtree Back To Basics Professional *(GL/AR/AP/INV)*	159.
Survivor Software MacMoney 3.0 *(Enhanced Version)*	62.

Networking Software & Hardware

CE Software Quick Mail	169.
Imagine Software Multi-User Appointment Diary with Smart Alarms	85.
Infosphere MacServe *(Network Software)*	158.
LaCie Silverserver	99.
Microsoft Microsoft Mail 1-4 users	195.
Nuvotech EasyNet *(Specify Din 8 or DB-9)*	27.
TurboNet 128/512k or TurboNet Plus	27.
Olduvai Software Clip Share	109.
Font Sharer	149.
Shiva NetModem V1200	359.
NetModem V2400	479.
Net Serial X232	309.
NetBridge	309.
SuperMac Software Multi-User SuperLaserSpool	199.
Acknowledge	*Special* 359.
Symantec InBox-MacConnection	79.
InBox-Starter Kit V2.0 *(3 Personal Connections)*	199.
TOPS Tops 2.0 or Net Print	119.
Tops Repeater	129.

Graphics Software

3G Graphics Images with Impact!	59.
ABA Software Draw It Again Sam 2.0	89.
Adobe Systems Adobe Illustrator *88*	325.
Aldus Freehand	379.
Altsys Corp. FONTastic Plus 2.0	59.
Fontographer 2.2	239.
Ashton Tate Full Paint	69.
Broderbund Print Shop	36.
Casadyware Fluent Fonts 2.0 *(2-Disk Set)*	26.
Fluent Laser Fonts Vol. 1-19 *(ea)*	45.
CE Software Calendar Maker 3.0	28.
Claris MacPaint 2.0	119.
MacDraw II 2.0	309.
Cricket Software Cricket Draw	169.
Cricket Graph	119.
Cricket Presents	289.
Deneba Software Canvas 2.0 *(Includes Desk Accessory)*	*Special* 165.
Canvas DA 2.0	75.
Diehl Graphsoft Mini Cad 4.0	375.
Dream Maker MacGallery *(Hypercard or Paint)*	29.
Dubl-Click Software World Class Fonts: 1&2 Originals, 3&4 Stylish, or 5&6 Giants	49.
WetPaint: 1&2 Classic Clip Art, 3&4 Publishing, 5&6 Animal Kingdom, 7&8 Special Occasions, 9&10 Printer's Helper, 11&12 Industrial Revolution, 13&14 Old Earth Almanac, or 15&16 Island Life	49.
Electronic Arts Studio 8 *(MacII)*	309.
Enzan-Hoshigumi USA MacCalligraphy 2.0	109.
Japanese Clip Art Scroll 1 *"Heaven"* or Scroll 2 *"Earth"*	52.
Year of the Dragon	21.
Foundation Publishing Comic People	25.
Comic Strip Factory	45.
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Dreams	319.
Laserware Laserpaint Color II	359.
Letraset ImageStudio	279.
Macromind Videoworks II	118.
Videoworks II Accelerator	125.
Videoworks II Driver for Hypercard	60.
Manhatten Graphics Ready Set Show	289.
Meta Software Design/2.0	199.
Micro CAD/CAM MGMStation	685.
Micro: Maps MacAtlas Paint 2.0 *(MacPaint Format)*	45.
MacAtlas Hyper Atlas	64.
MacAtlas Professional *(PICT/MacDraw Version)*	129.
Microsoft Microsoft PowerPoint 2.0	249.
Olduvai Software Post-ART II *(4-Disk Set)* or ArtFonts	59.
Silicon Beach Software Digital Darkroom	159.
SuperPaint 2.0	109.
Super 3D	159.
Super 3D Enhanced *(Mac II)*	249.
Solutions International The Curator *(Catalog Your Art)*	79.
Springboard Certificate Maker	24.
SuperMac Software Pixel Paint	259.
T/Maker Click Art Letters I, Letters II, Personal Graphics, Publications, Effects, Business Image, or Holidays *(each)*	28.
Christian Images	35.
Click Art EPS Illustrations	75.
Zedcor DeskPaint 2.0	69.

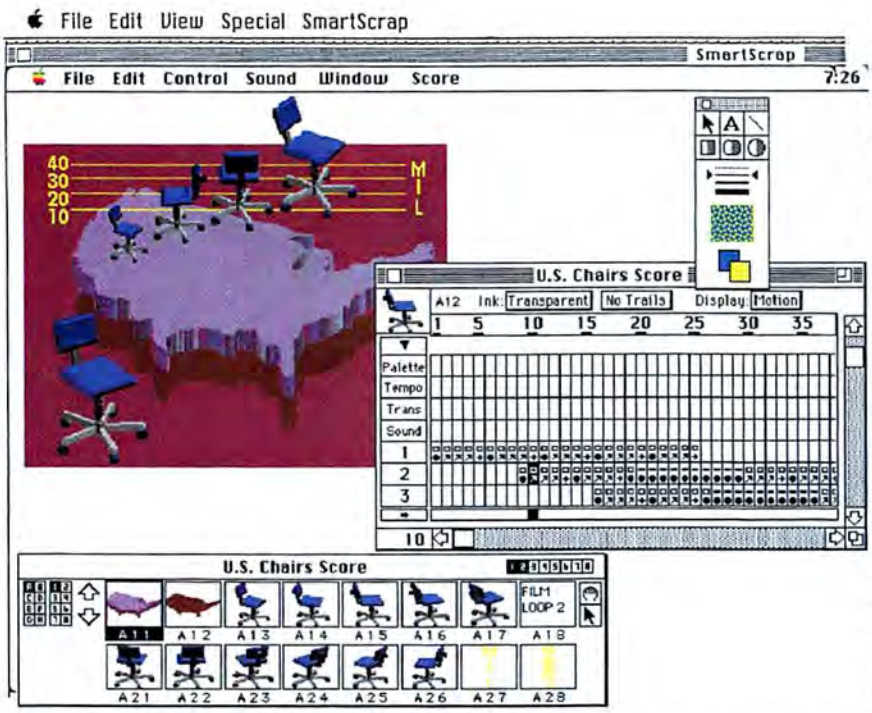
Educational/Creative Software

Baron's Baron's SAT	35.
Bible Research The Word (KJV or NIV)	165.
Bogas Productions Studio Session	49.
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1st Byte/Electronic Arts Kid Talk, Speller Bee, First Shapes, or Math Talk	32.
Great Wave Software KidsTime	26.
Concertware+ MIDI 4.0	79.
Learning Company Reader Rabbit	33.
Mindscape Perfect Score SAT w/The Perfect College	46.
Nordic MacKids Educational Programs *(each)*	*Special* 28.
Simon & Schuster Typing Tutor IV	35.

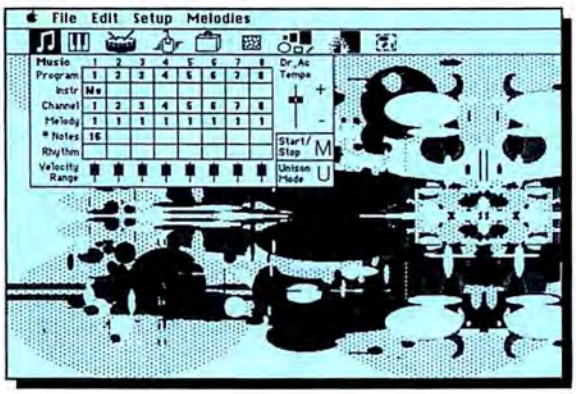
Game Software

Access World Class Leader Board Golf	34.
Accolade Hard Ball	23.
4th & Inches	24.
Activision Firepower	16.
Shanghai, Romantic Encounters or Jinxter	24.
Universal Military Simulator	30.
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Sky Travel	45.
Artworx Bridge 5.0	22.
Avalon Hill Mac Pro Football	30.
Baudville Award Maker Plus	29.
Broderbund Ancient Art of War or Ancient Art of War at Sea	27.
Poster Maker Plus	39.
Bullseye Software P51 Mustang or Ferrari Grand Prix	32.
Centron Crapsmaster or Roulettemaster	28.
Electronic Arts Ogre	20.
ChessMaster 2000	28.
Chuck Yeager Flight Simulator or Life & Death	36.
Starfleet I	37.
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One-On-One, Pinball Construction Set, Seven Cities of Gold or SkyFox *(each)*	15.
EPYX Winter Games or Sub Battle Simulator	24.
Hayden Software Sargon IV	29.
H.J.C. Software, Inc. Air Traffic Control Simulator	35.
Infinity Software, LTD. Go	27.
Infocom Leather Goddesses of Phobos	24.
Beyond Zork	30.
Hitchhiker's Guide to The Galaxy	18.
Zork Trilogy	42.
Microsoft Flight Simulator 1.02	32.
Micro Sports MSFL Pro Draft	26.
MSFL Pro League Football	32.
Miles Computing Inc. Harrier Strike Mission II or The Fool's Errand	27.
Mindscape Balance of Power, Crossword Magic or Citadel	30.
Deja Vu: A Nightmare Comes True	30.
King Of Chicago or Shadowgate	30.
Defender of the Crown, Colony or The Uninvited	30.
Practical Computer Applications Lunar Rescue	30.
MacGolf or MacRacquetball V2.0	35.
MacCourses	34.
Primera Smash Hit Racquetball II	21.
Sierra On-Line Leisure Suit Larry	23.
Space Quest or Space Quest II	30.
Police Quest	35.
Silicon Beach Software Dark Castle or Apache Strike	27.
Dark Castle or Apache Strike	27.
Beyond Dark Castle	27.
Simon & Schuster Star Trek *(The Kobayashi Adventure)*	24.
Star Trek *(The Promethean Prophecy)*	24.
Sir-Tech Mac Wizardry	35.
Sphere, Inc. Tetris	23.
GATO, Orbiter, Falcon, or Pt-109	26.
Solitaire Royale	19.
Studio Zero Orbital Mech	35.
XOR Software NFL Challenge	64.
Pro Challenge or Basketball Challenge	30.

Interactive Cultures



VideoWorks Pro is a high-end version of the popular MacroMind graphics and animation program that incorporates more features, an improved interface, and easy-to-use templates.



Take a sprinkle of music, a handful of graphics, toss it all into OvalTune, stir gently (with the mouse), and presto! It's a simple recipe for interactive audiovisual performance and composition.



Songs in the Key of — just what key is that anyway? You don't have to write music in a key signature with both sharps and flats (doesn't AC/DC play in that key?) to appreciate the many and diverse capabilities of Finale, the anxiously awaited notation package from Coda.

and weaknesses (see "Simpler Samplers" in this issue).

Composers and arrangers can use desktop publishing to print anything from lead sheets to orchestral scores (see "The Write Staff" in this issue). To keep track of all your synth *patches* (the different instrument sounds), a patch editor/librarian will come in handy (we'll be reviewing patch editor/librarians in a future issue).

One of the hottest buzzwords in music software these days is *algorithmic*. With algorithmic software — which is used mostly for composition — you can establish certain musical parameters within a piece while letting the Mac make the final choices about what the music sounds like. All of this happens in real time with the performer taking on a role more like that of a conductor, evoking music rather than playing it. Music Mouse (distributed by Opcode) was one of the pioneers in this genre, and it's due for a new version, possibly by the time you read this. A trio of programs from Intelligent Music — M (with a new version, 2.0), Jam Factory (not to be confused with Jam Session), and UpBeat — were reviewed in our October '87 and May '88 issues. A new Intelligent Music program — OvalTune — should be released soon. It marries a video component to the sound, creating instant MTV. The sidebar "Get Smart" also describes some of the latest research aimed at creating musically sensitive software.

SECRET CODA

In an era when physicists are off looking for a grand unification theory of everything, the folks at Coda Music Software may have found it — at least as far as music software goes — with a program called Finale (that was due to be released in August). Finale will become either the Cadillac of music software or the Edsel, and I'd put my money on the former. Although the price is high — $1,000 — the jump in functionality over previous programs is incredible. Finale is the first program that takes a complex, multiple-voice keyboard performance and instantly transcribes it on your very own Mac screen in standard music notation,

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Author / Editor:
Charles Seiter

INFO WORLD

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Author / Editor:
Doug and Denise Green

MacUser

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Staff

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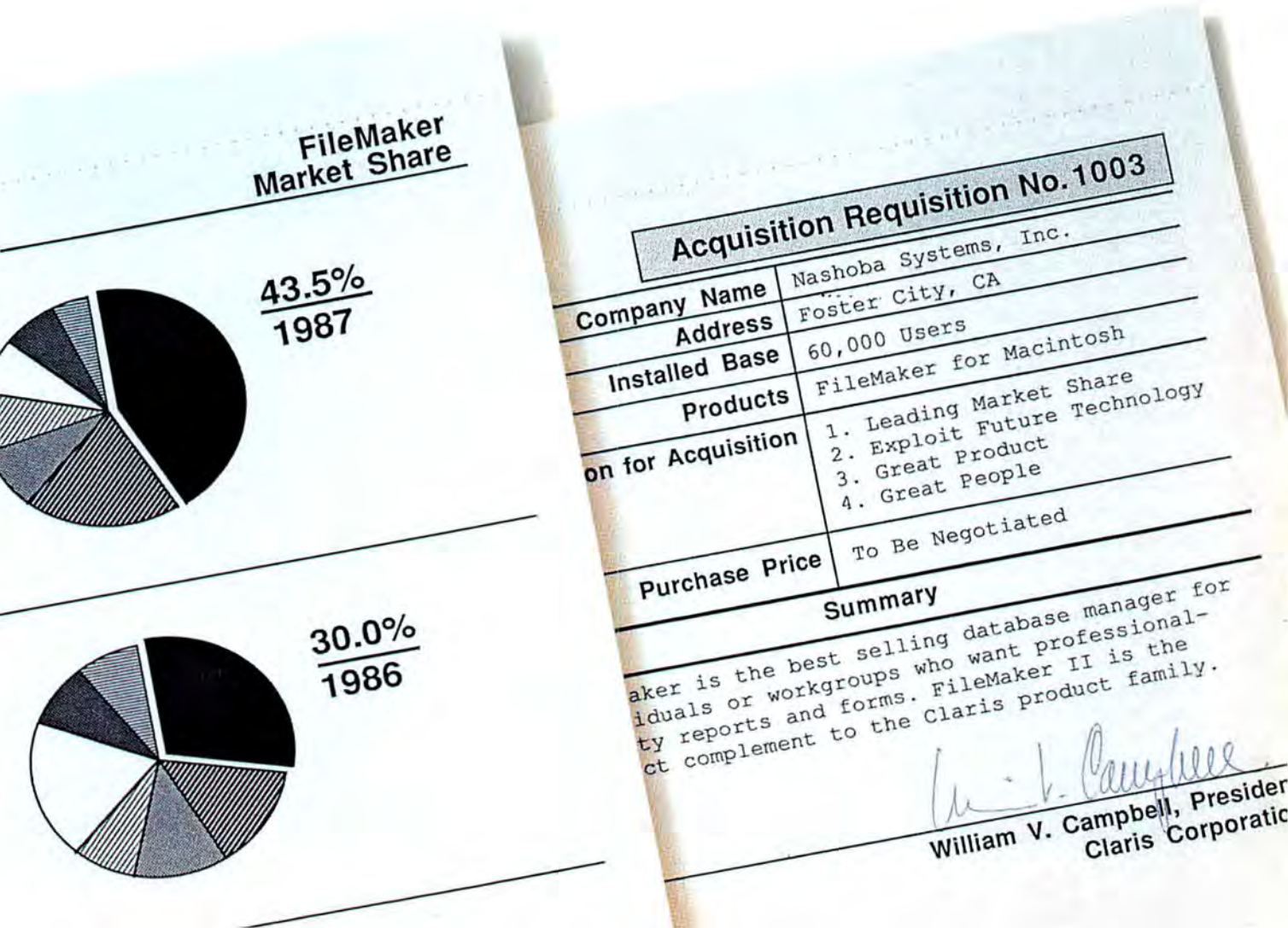
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ready to print out. This is a wonderful parlor trick to show off with (at parties, concerts, and product demos, for example), but it's not the real reason to get excited about Finale. Other software has been around that could do this in a two-step process — by recording the performance in a sequencer and importing the sequence into a notation program — and saving that intermediate step isn't that big a deal. The real beauty of Finale is far more than skin deep. It lies in the smarts with which it interprets the subtleties of music notation. Notation is a tricky business, and Finale gets it right far more often than software has any right to.

Compared with its predecessors, Finale isn't just a better product, it's a new category; it's like comparing PageMaker 3.0 with MacWrite 1.0. Composer Wendy Carlos, a beta tester for Finale, says of the program: "It contains the features of the music program we've all been hoping for." (Incidentally, she has a new album due out about now that was created on a Mac — it includes a new version of Prokofiev's *Peter and the Wolf* and a sequel to Saint-Saen's *Carnival of the Animals*. It's on CBS records and was done with — who else? — Al Yankovic.)

What does Finale do? For starters, it creates scores in which all notated events can be MIDI-aware. That is, staccato, dynamics, accents, and suchlike can all have an executable (and user-definable) meaning that can be relayed via MIDI. And you're not limited to standard music symbols, either. It takes only a click or two to redefine a standard crescendo symbol (which normally indicates a gradual increase in loudness) as a symbol for increasing the tempo, for gradually modulating to a different key, or for steadily increasing the MIDI channel or patch number. If you didn't want a steady, linear increase, you can draw in an *executable shape* — you can have *crescendos* with exponential or Bezier curves that behave just as they look like they should. You can create a library of these executable shapes — for notating and playing back pitch bends, trills, or jazzy riffs, for example. And all of your newly invented symbols

Surreal Port

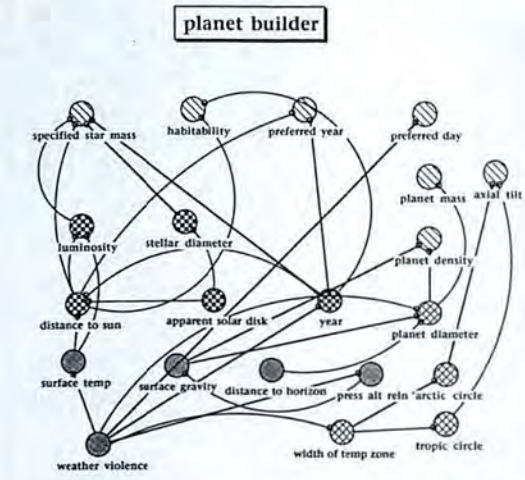
We weren't sure if we should — or how to — include writers in our look at the arts. Writers write, and everybody knows about all the great word processors at their fingertips. But writers do more than write; they create. They create ideas, relationships, characters, lives. And they can use a little help in keeping track of the details.

Suppose you were going to create an entire world from scratch. That's a lot of details to keep track of. You need to keep track of your facts if you hope to maintain some internal consistency. Of course, it's your world, and you could always postulate that consistency hadn't been invented. But that won't fly in the genre of "hard" science fiction. Hard sci-fi readers expect novelty, but they also demand adherence to certain rules and natural law. Realism, in a word.

John Barnes is a hard sci-fi author (*The Man Who Pulled Down the Sky, Sin of Origin*, and several short stories). He uses STELLA For Business — the simulation program from High Performance Systems (reviewed in our June '88 issue) — to build models that help him check his assumptions and reveal hidden implications about the worlds and futures he makes up. He uses one of these models, Planet Builder, to visualize what it's like to put your feet on the surface of an alien world. The model starts with some basic astronomical and environmental parameters and uses basic physics and some sci-fi rules of thumb to determine such descriptive parameters as the size of the sun in the sky, how long a year on this planet is, and how violent the weather is compared with earth's. The purpose, says Barnes, is to get answers to questions like "Is it possible to stand around on this planet in your BVDs?" or "Is it conceivable that people could walk around here without breathing apparatus?"

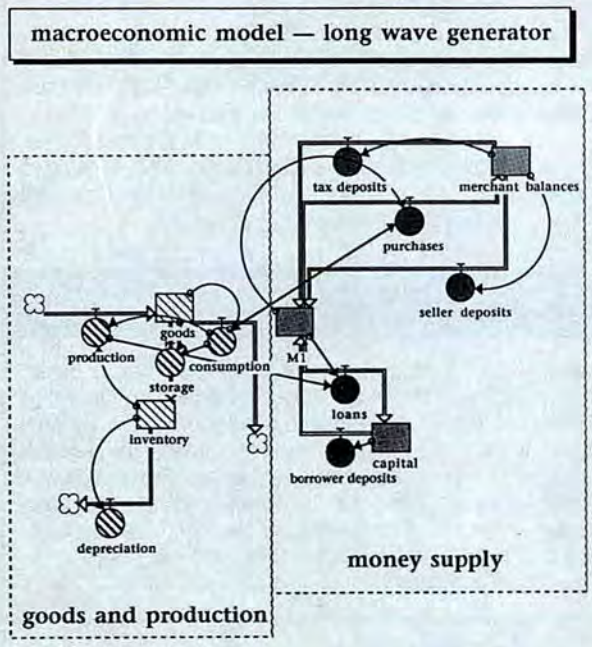
Barnes has also developed a macroeconomic model to help predict some of the social aspects of particular eras in the future. The model looks for regularities in world affairs, like cycles of war and peace or of economic depression and prosperity. Barnes believes that people are interested in science fiction for the same reason they're interested in models of the future — because the future is where they're going to live.

With STELLA, models that took days to create can be created in hours, freeing Barnes to concentrate on the more important questions of fiction that models can't answer: "What's it like there? When you look out the window, what should you see?"

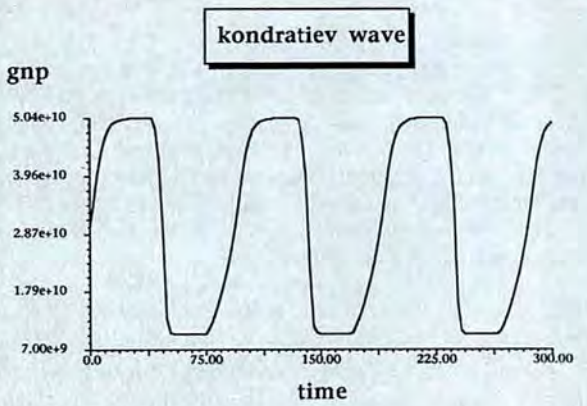


time	apparent solar disk	distance to horizon	surface gravity	surface temp	weather violence	year
0.0	0.630	5820.00	0.378	-41.24	-0.870	2.00

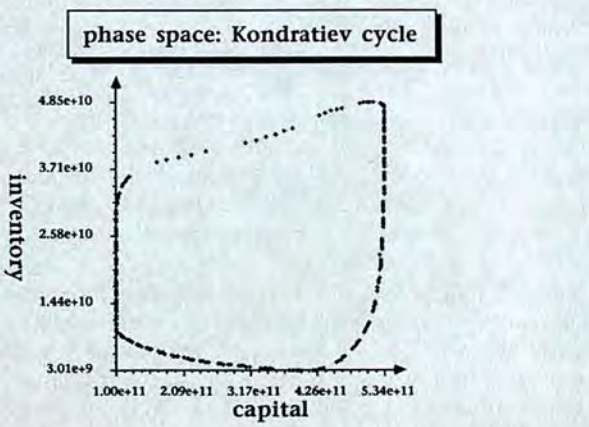
Planet Builder turns astronomical and environmental data into the kinds of useful detail that a good "hard" science-fiction story needs. How fast does the wind blow, and what does it feel like? In a dense atmosphere, every little breeze will have the force of a hurricane. The model churns out the data that gives author John Barnes more time to think about other things.



The macroeconomic status of the world is something that one doesn't often see in science-fiction, says Barnes. But if one of your characters is having a fight with his boss, it makes all the difference in the world (any world) if the planet is in the middle of a worldwide recession. This model is used as a driver for other models, so that when everything comes out the other end, it has the fuzzy look of a real world.



The Kondratiev wave is an empirical economic concept that describes the long-term cycles affecting the health of the economy. (Kondratiev was a Soviet economist whom Stalin hired to predict when the West would collapse; instead, he discovered long-wave phenomena.) Incidentally, Barnes says that the 1990s don't look so good, and the 2040s will be worse.



Barnes uses this phase diagram to see what's really going on underneath the model. There's a constant global struggle to balance the accumulation of captial with the accumulation of inventory, and societies tend to overreact to try to correct a surplus of one or the other. The values in this model are from the simulated country of Normalia — an imaginary Western industrial nation where all the values are very convenient ones to work with — this country of exactly 10 million people will, by the middle of the next century, have a Gross National Product of exactly one trillion dollars.

print with all the detail of PostScript.

Finale has lot of nice touches and shows a real attention to the endless details of both classical and contemporary music. For example, the program knows when to call an F-sharp an F-sharp and when to call it a G-flat. Transposed parts can be displayed either in the key in which they actually sound or in the key in which they're customarily written. (Oh, did I mention that it's a breeze to extract orchestral parts from a piano score or to "implode" parts into a condensed score?) And, naturally, the program also reads in existing MIDI files, as well as word-processing files (for lyrics and explanatory text).

But the real pizzazz only starts to show when you dig deeper. I'll tantalize you with only a couple of features — we'll be covering Finale with a full review as soon as it's finally released. How about this one: When you're playing in a piece, you can state where the split between your left and right hands is, so that Finale will put the right notes in the right staff. For music where both hands are moving up and down the keyboard, you can set the Active Split option and let Finale figure out what notes go with which hand, based on the musical context and on the span of your hand. And it can even deduce if and when you're playing cross-hand style.

Another mind-blowing feature is floating quantization. Quantization is one of the main problems with notation. You don't want the program to show exactly what you played; even the most rhythmically precise players will be just slightly off the beat. The goal is to round notes off — or quantize them — to the nearest reasonable value (typically eighth or sixteenth notes). Too much quantization leads to transcriptions that don't know what to do with grace notes, trills, tuplets, and all the other realities of interesting music. Finale's floating quantization lets the program decide — on the fly — how much quantization makes sense for each passage. And the floating tuplet parsing is one of the features that has especially impressed composers of complex contemporary music (like Wendy Carlos).

For even more control over the transcription, you can enter the beats and measure breaks — either while you're playing or afterward — by tapping a pedal or a note on the keyboard. That makes it easy to tell Finale when you're moving in and out of different time signatures, tempos, swing rhythms, and so forth. Unlike some other notation programs, Finale seems equally at home in pop and classical, to say nothing of the shape-notes font for gospel, the microtuning options for avant-garde, and the intelligent tablature and chord symbols for guitar and other kinds of stringed instruments (including those not even invented yet).

Finale also has a welcome quirky sense of humor. The icons in Finale, for example, follow the progress of a monk transcribing music the old-fashioned way. The commands and options have names like Trashy Transcription (a quick-and-dirty notation tool), Igor's View (a view of the page in which the entire score is printed on one long line, à la Stravinsky), and Back-O-Matic (go figure). (Finale doesn't have a monopoly on cuteness: Another notation program, Music Publisher, has commands called Beam Me Up and Tie Me Up. Incidentally, Music Publisher is the program from Graphic Notes in Santa Cruz, not to be confused with an as-yet-unreleased program from Shaherazam in Milwaukee that has changed its name to Brass.)

What's the down side? Well, Finale isn't just expensive; it's complicated, too. But not any more complex than, say, accounting software. It's also modular, so that you can become productive on some aspects of it without trying to master it all. Some aspects of the interface are a little convoluted, although the developers say they wouldn't have been able to fit the whole thing on an 800K disk if they'd added code to simplify things. Coda expects to unbundle some of the modules, which would leave a little more room on the disk for interface considerations (and which would bring the price down from the stratosphere).

At the very least, Finale will become a studio tool — something that mere mortals don't own or know how to use but for which they pay studio wizards and gurus handsome hourly rates to make everything work.

Mr. Softy

Soft-Drop is a new video post-production subscription service, the MIDI alternative to "needle-drop" services. Subscribers are provided with a rack of equipment that includes a Mac and several synths. They can log on to the system via modem and download ready-to-play sequenced music, indexed and cataloged in a HyperCard stack. Unlike conventional "needle-drop" music services, the MIDI sequences can be customized simply by editing the sequences.

For composers, music can be submitted for "publication" in sequenced format; the composer need not worry about the logistics and cost of turning MIDI sequences into tape. For more information about subscribing or submitting material, contact Soft-Drop at 12080 SW Parkway, Portland, OR 97225; (503) 626-9084.

Mr. Microtune

Some of the newest synths can be tuned to microtonal scales, which depart from the familiar Western 12-tone chromatic scales. A $49 package called TuneUp Microtuning Library (from Antelope Engineering, distributed by Frog Peak Music) includes 100 different microtunings from non-Western musical traditions that can be downloaded to modify the tuning of a Yamaha TX81Z or DX7-II synth. These tunings include ancient Greek just intonation, gamelan tunings, medieval and modern Arabic scales, and contemporary experimental settings. Contact Frog Peak Music at P.O. Box 9911, Oakland, CA 94613; (415) 485-6867.

Mr. Universe

Perhaps somewhere on the Universe of Sounds CD-ROM disc is the digitized voice of Carl Sagan, lost among billions and billions of bits that represent sounds of all kinds. The $995 disc includes 2,500 different high-quality samples — already looped, cross-faded, and ready to use — of everything from orchestral instruments to sound effects. The sounds are stored in Sound Designer format (compatible with Alchemy and TurboSynth) and can be uploaded to most popular samplers. The sounds are cataloged using HyperCard to help you locate just what you're looking for. For more information, contact Optical Media International, 485 Alberto Way, Suite 115, Los Gatos, CA 95032; (408) 395-4332.

THE 'MORROW AND THE MIDI

Let's take a peek at the ultra-high end of the Mac-based art world. Let's go to a land where Walt Disney meets Mac MIDI *[and comes out Walter MIDI? — Ed.]*, where animation and music merge. To a land where price tags make your eyes twirl. To a land called Synclavier.

Remember the dueling piano scene in *Who Framed Roger Rabbit?*, in which ducks Daffy and Donald did battle at the keyboards? They weren't Ferrante and Teicher, but it *was* impressive. Not just because it was the first time cartoon characters from Warner Brothers and Walt Disney shared the stage, but because it was probably also the first time that MIDI has played an important role in the visual — not just the audio — portion of a movie. The real-life piano keys were MIDI-controlled by a New England Digital Synclavier (under the supervision of the film's composer, Alan Silvestri), making it possible for the animators to perfectly match the real-life images with the animated duo. The Synclavier is the ultimate MIDI synthesizer/sampler/sequencer/SMPTE controller/breath mint all in one box, and it just got a Mac as its front end. Having a Synclavier as the Mac's big brother is a little like having a rich uncle — you're not sure how or when it'll help, but it couldn't hurt. (See sidebar, "The Well-Tempered Synclavier.")

The Well-Tempered Synclavier

In the category of "world's most expensive Macintosh peripheral," consider a new nominee: the Synclavier. The Synclavier (pronounced Sin'-kla-veer) is a digital-audio workstation, manufactured by New England Digital (NED) of White River Junction, VT, that is increasingly popular among high-end music and audio-for-video studios. Stevie Wonder uses one, Frank Zappa has been remixing all his old records on one, Sting has several, and Max Headroom lives in one.

Originally conceived more than a decade ago as a computer-based synthesizer for use by students at Dartmouth College, the Synclavier has evolved into a highly complex digital recording and processing unit. It uses custom audio-processing hardware — it's essentially a specialized music minicomputer — and over the years has come with a variety of displays, including a modified DEC VT100 and a color CAD/CAM terminal made for NED by a British manufacturer. Recently, however, NED decided to use the Mac II as the system's front end.

The Synclavier itself, however, will still do the sound synthesis. It also performs several other useful functions, like score generation and sonic analysis. Two other parts of the system that are generating a lot of excitement these days are *polyphonic sampling* and *direct-to-disk* (or *tapeless*) *recording*. Polyphonic sampling lets the user record any sound into RAM — a piano, a thunderclap, a spoken phrase — and edit it in a huge variety of ways, including changing its pitch, timbre, envelope, or speed, while displaying the parameters and the sample waveform itself on the terminal. (That graphic representation is where the Mac comes into play.) The sound can then be played back, in its original or modified forms, either from a 76-note piano keyboard or using an internal 200-track computer sequencer, which in turn can be synchronized to an audio or video tape.

Eight, sixteen, or more sample voices can be played at a time, depending on the particular system's configuration. Since each sample can be a different instrument, the device can create an entire orchestra out of sampled sounds. And because the sounds remain in the digital domain, the sound quality can be near perfect, and all editing is nondestructive.

The direct-to-disk system is like a multitrack tape recorder, with up to 32 tracks, in which the sounds are recorded digitally for maximum fidelity. However, unlike recording on standard audio tape, with the Synclavier each individual track can be cued to start, stop, rewind, and restart at any point, completely independent of the others. As a result, the system is equivalent to multiple individual tape recorders, all synchronized to each other, in one unit. The recorded tracks are stored on removable disk packs of 80 megabytes or more. (Figuring on about six megabytes per track per minute to record better-than-CD-quality sound, an 80-megabyte disk is good for about three or four minutes of four-track music.)

For generating sound effects, matching music to picture, or editing dialogue, the Synclavier is hard to beat. But the front end has always seemed a little kludgey compared with the power it controlled, and that's why NED has put the Mac into the picture. After evaluating everything on the market — including products from Sun, Apollo, IBM, and HP — NED settled on the Mac II. The company has written its own custom software that will allow up to 18 open windows at a time and will also support double displays on the Mac. This lets a user look at waveforms on one screen and do sequence editing on the other. The software is not yet MultiFinder compatible, but that may change. NED also plans to let standard video images be displayed on the computer screen, so users working with videotape won't have to keep referring back to a separate video monitor.

The new front end — which should be available by about the time you read this — will be offered as an option to both new and current users of the Synclavier. It will come with a custom high-resolution color monitor and a high-speed graphics card, as well as 2 megabytes of RAM. The company will also include stands and goosenecks to integrate the new hardware with existing hardware like the music keyboard. There's only one floppy drive included, and no hard disk included for the Mac; the Synclavier handles all the heavy-duty data storage. So a special super-speed communications card between the two computers is included.

NED customers who already have Mac IIs (for MIDI sequencing, music editing, or business purposes) can add just the peripheral hardware, but most end up buying a dedicated Mac just for the Synclavier. If you think two Mac IIs is an extravagance, you have to consider the league that New England Digital plays in: A relatively modest Synclavier, with four tracks and 80 megabytes of direct-to-disk recording, and another 80 megabytes of backup disk memory for the samples, goes for about $250,000.

— Paul D. Lehrman

The Mac II has two new musical big brothers: the New England Digital Synclavier and the NED Direct-to-Disk recording systems (like the PostPro system shown here). Since real estate for a mouse pad is scarce in the typical recording studio, a trackball is standard equipment.



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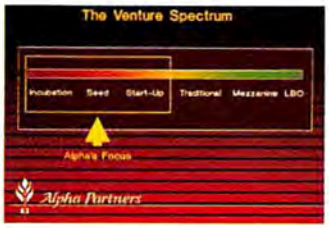


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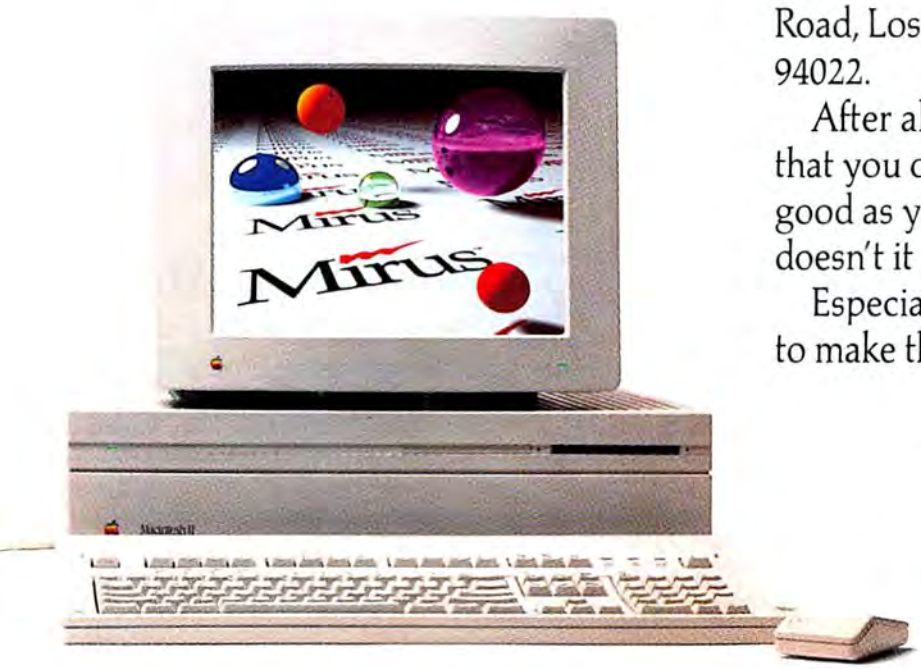
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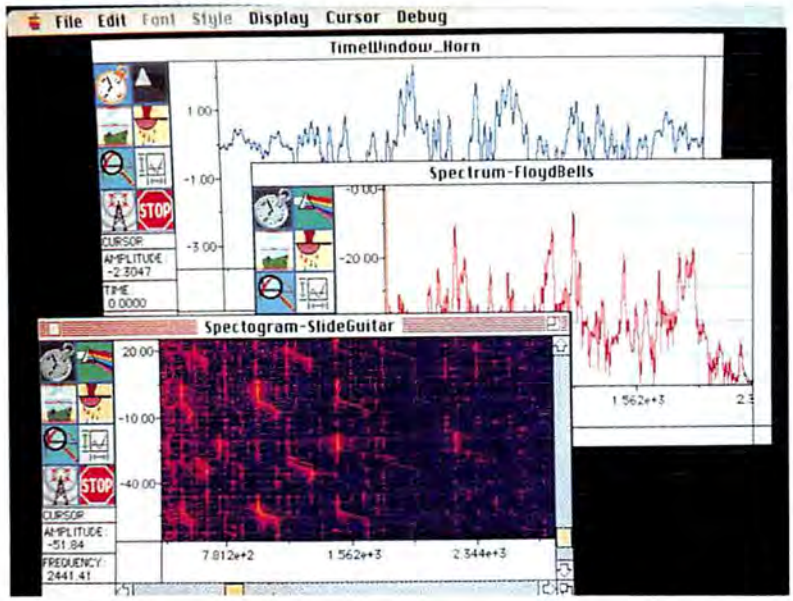
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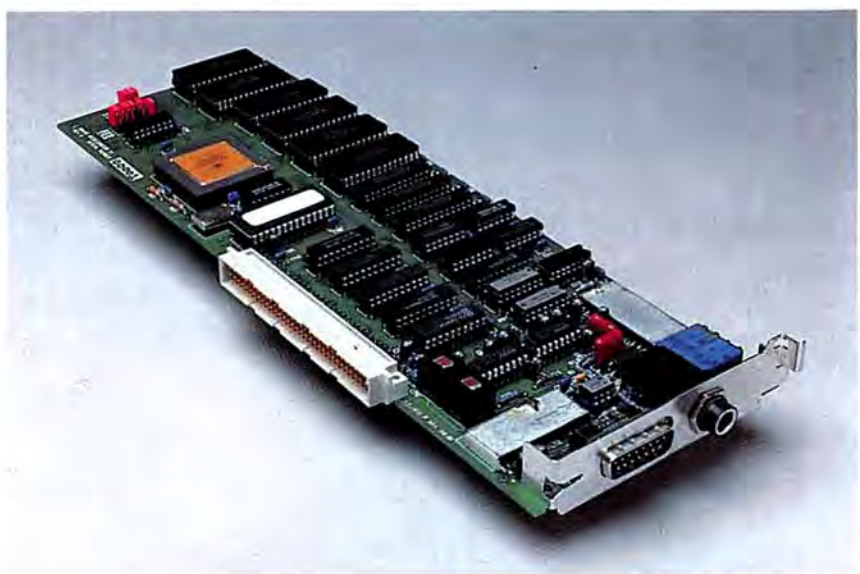
Since you can also control lighting, mixers, and basically any electrically actuated equipment with MIDI (if you're willing to do a little customization), MIDI will likely be used as the heartbeat of yet more special effects in Hollywood, particularly when synchronization to music or sound effects is critical. And MIDI is equally applicable for live theater and dance.

But unless you're one of the 130 people who bought Synclaviers last year or one of the 200 full-time music copyists in the U.S., you might be wondering why you should care about Finale, Synclaviers, and other high-priced toys. Well, the folks at Coda are betting that there are scores of "sublimated professionals" out there, after-hours musicians who want the tools to make the most of their hobby. Keeping the program under wraps, they say, was tough, since everybody was interested (including the police, who showed up when a security alarm was accidentally triggered at Coda's offices and who ended up leaving with Finale brochures in hand).

And, on the hardware side, the recording studio equipment of today will be the basement studio equipment of tomorrow — or at least of next month. New hardware is already on the way for the Mac II. Digidesign's Sound Accelerator board is designed to let you produce studio-quality sound onboard. This saves you lots of time when transferring samples (which are big files) between Mac and sampler. Other boards are forthcoming: for research, (from universities like M.I.T.); for laboratory-oriented sound analysis (like the MacDSP board from Spectral Innovations, a general-purpose floating-point accelerator card and signal-processing analysis package for the Mac II, based on AT&T's DSP32 processor); and from commercial music-oriented companies (like Southworth, which has some new boards due out by about now, described in this month's New on the Menu).



MacDSP is a general-purpose, digital-signal-processing board aimed at laboratory applications. When applied to sound, it can help you analyze and visualize music, speech, and other acoustic phenomena.

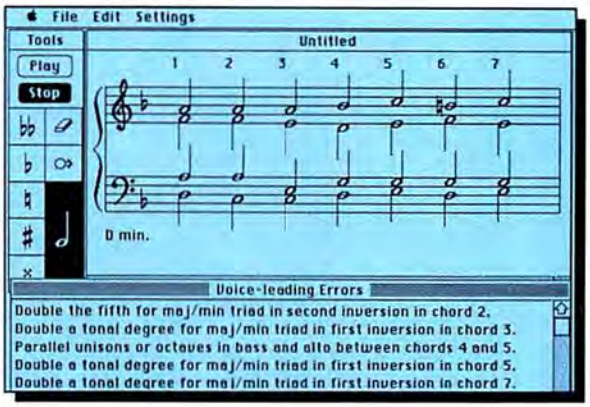


Digidesign's Sound Accelerator board lets you preview sampled sounds straight from your Mac, saving you time (and money, if you're paying hourly studio rates) by eliminating tedious file transfers between your Mac and your sampler.

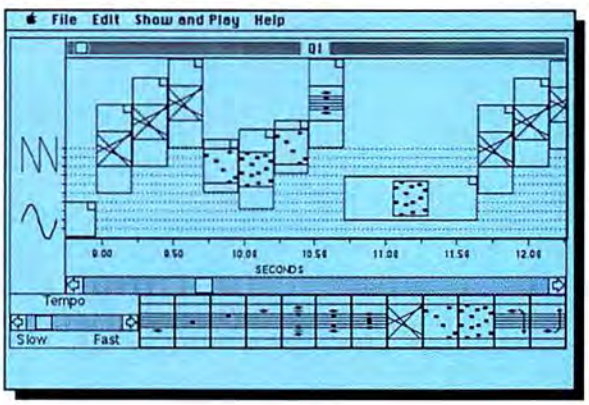
HOMEWARD BOUND

Let's forget the technobabble for a moment and get back to the music. (Reading specs for a MIDI instrument can start to sound suspiciously like computer shopping, what with optional 20-megabyte internal hard-disk drives, your choice of external disk drive, various interface options, and regular or extended keyboards.) If you're looking for music software that emphasizes the music and not the software, fear not. There are many applications that don't come with three-volume manuals and video training tapes. Check out "Note Cards" in this issue for a glimpse at some of the simple (and inexpensive) music stacks that have made HyperCard one of the hottest things in music.

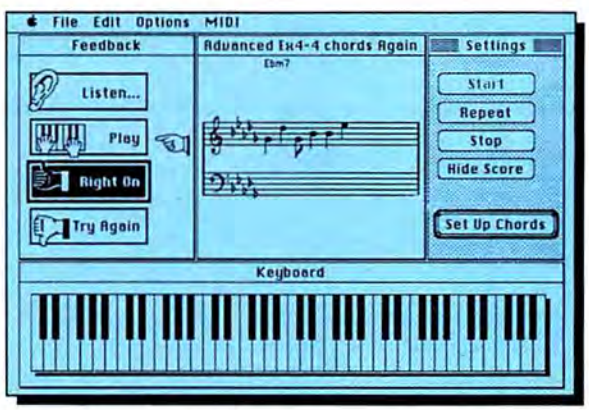
For a zen-like musical experience, keep an eye out for Harmony Grid, from Hip Software (due out around



You've got to learn the rules before you break them, or so they say to skeptical music theory and composition students. In any case, MacVoice can help you become fluent in the workings of classical counterpoint.



We've heard of songs without words, but songs without notes? Appletones focus on the structural aspects of composition — rhythm, timbre, repetition and patterns, and dynamics — using a collection of 12 archetypal sounds.



You can proceed through the ear training exercises in 7th Heaven at your own pace. The program includes lessons suited for every level, from tin ear to Tin Pan Alley.

now). Harmony Grid uses a graphic representation of scales and chords to show you visually the patterns you've been hearing all your life. It's hard to explain, but it evokes an odd simultaneous sense of déjà vu and of seeing something new.

If you want to hone your musicality, there are lots of educational tools available. A new program from Sonus called 7th Heaven tries to present the somewhat off-putting subject of music theory in an intuitive way, emphasizing ear-training drills to help you learn to understand the kinds of chords and symbols used in contemporary sheet music. It can be used with or without a MIDI keyboard (although, if you elect to use the Mac's internal sounds, you'll get a dialog box that gently chides you with the message: "You can get a MIDI keyboard for under $500 and a MIDI interface for about $100").

If you'd rather learn classical music theory — sixteenth century counterpoint, for example — you'll be interested in Palestrina, a new program from Kinko's Academic Courseware Exchange (ACE) Catalog. The ACE programs are inexpensive and have a slightly academic slant, although they're perfectly suitable for self-education. In Palestrina, the challenge is to compose contrapuntal harmonies to a given melodic line. The program highlights the notes in your counterpoint that violate standard composition rules of the era. MacVoice is a similar ACE program that evaluates your compositions using the rules of eighteenth-century counterpoint.

Zipping ahead to the twentieth century, Appletones is a nifty program that lets budding composers focus on the structural aspects of music, rather than the notes. The program gives you a palette of 12 predefined classes of sounds — a low note, a high note, a tight interval, a wide interval, a rising note, a falling note, a flurry of notes, and so on. You can control the placement, durations, dynamics, and timbres — but not the pitches — of a piece composed using these 12 tones. On the same disk (which, at $13, is a great buy) is a program called Mozart. It's based on a simple musical divertissement he came up with in 1787: the musical dice game. Take six predefined two-measure phrases and assemble them in any order to come up with a perfectly decent little minuet.

Jam Session (from Broderbund) is a more contemporary version of the same concept, building fully orchestrated pop, funk, country, and classical music from a library of riffs and licks that you access through the Mac's own keyboard. You don't need a synthesizer and you don't even need any musical talent — anybody, and I mean anybody, can make creative, expressive music with this program.

LISTEN, MY CHILDREN

Lest we forget, the goal of music is to produce something that others will listen to. And the Mac is also forging new ground on the listener's side of things, helping to create new media and formats for distributing music, like prerecorded MIDI sequence "albums." Syn-Comp Productions will be releasing a series of MIDI albums compatible with many of the leading Mac sequencers. These sequences of pop, rock, classical, and jazz songs are aimed at professionals who want pre-

sequenced "backup musicians" for their live performances, as well as at listeners who want to be active listeners — playing along on another MIDI channel or experimenting with some of the MIDI parameters.

Another format to watch is CD+MIDI. It's a proposed format from Warner New Media that uses some of the space on a traditional CD disc for MIDI information. This MIDI data lets you listen to and simultaneously play along with a song on CD. An inexpensive CD-to-MIDI converter would then turn a passive medium into one with interactive potential, in a high-tech twist on the old Music Minus One records. The difference here is that you could control which tracks to delete, or you could change all the patch data. The proposed format would use about 30 megabytes — or 5% of the CD's capacity — for MIDI data.

PORTFOLIO

The artistic community is often a tight-knit one, and the musical Mac often serves as an ambassador to other arts. A storyboarder gets intrigued when he sees a Mac over in the film-scoring department. An album-cover designer gets hooked when he sees a Mac in the recording studio.

In "Portraits of the Artists" (in this issue), we've tried to convey some of the flavor and variety of Mac-based artists at work. If there's a common thread among these profiles, it's that you don't need a megastudio full of equipment to produce truly creative and wonderful art. The more toys you have, of course, the more power is at your disposal. But with even a modest system, you have incredibly creative tools at your fingertips. Even if all you have is a lowly Mac 512K, an ImageWriter, and good old MacPaint and MacWrite, you can still write the great American short story — or screenplay, or symphony, or sculpture . . . and that's just the *s*'s!

WHEN HE'S NOT EDITING MACUSER DEPARTMENTS, JON ZILBER USES HIS DX7 TO SYNTHESIZE SONGS LIKE "LOVE SONG FOR AMY CARTER," "DEAD BABIES," AND "JULIUS CAESAR WEARING ARGYLE SOCKS."

Get Smart

Algorithmic music software provides real-time interactive control for performers and composers. Some of the commercial packages emulate the way many composers work: They sit down at the piano (or whatever their instrument) and start improvising. Much of the improvisation is unmemorable. But when they hit a phrase, chord progression, or riff that they like, they make a mental (or written) note of it and keep going, adding that passage to the piece and improvising some more until they find something else they like.

Other composers work differently — they have goals and constraints that almost uniquely define what the passage must sound like in advance. You could compare the process to finding a solution to a mathematical equation. Suppose you want to start on an F-major seventh chord, end up with a B-flat in the melody at the end of the phrase, pass through a particular series of chords, and have the whole thing in an Oscar Peterson style. By working backward from your goal, you can reverse-engineer a possible solution to your compositional constraints. Hip Software, an M.I.T. Media Laboratory spin-off, is developing software along these lines.

For even more algorithmic flexibility, There are several programming languages and systems that you can use to create new instruments in software. There are MIDI versions of standard languages that include extra commands for MIDI control. And there are completely new music-oriented langauges, like the Hierarchical Music Specification Language (HMSL), developed at the Center for Contemporary Music at Mills College and available through Frog Peak Music. HMSL is an object-oriented set of extensions to the Forth language. HMSL lets you develop real-time and batch composition and performance tools. The HMSL toolbox includes algorithmic and artificial-intelligence-type tools, modules for generating hierarchies of programmable musical structures, and a graphics editor for visually editing musical parameters. The program has also been used to control output devices other than MIDI synths. For example, a piece called *Air Player 9* used HMSL to control electric fans blowing on a large kinetic paper sculpture, to produce both visual and sound effects.

The M.I.T. Media Lab is developing a number of what it calls *hyperinstruments*. A hyperinstrument resides in software; its characteristics and operation can be

This Is a Recording

If you've got a recording studio — or if the one you rent time in has a Mac — there's lots of software to help you make the most of your studio time. Studio Master Plus (from Studio Master Systems) is an integrated software package for tracking nearly every aspect of a recording studio's operation. It includes a billing system that automatically picks up the amount of time that tape was running, bills clients at the appropriate hourly rate, adds in tape charges, lets you add in miscellaneous charges (if, for example, someone orders a pizza), creates track sheets and tape labels, and generates bills and invoices. It also lets you enter a preset credit limit; if it's exceeded, the speakers shut off. Another module lets you graphically record the position of every control knob and slider. An optional mixing console interface lets you match spectrum and output levels with those for previously recorded tracks, using an animated procedure that walks you through each of the necessary adjustments.

Archie, from Words & Deeds, is another recording studio management tool, based on a run-time version of Double Helix. It handles both the financial and recording aspects of running a studio and includes form letters and other administrative tools.

HIT THE TAPE DECK

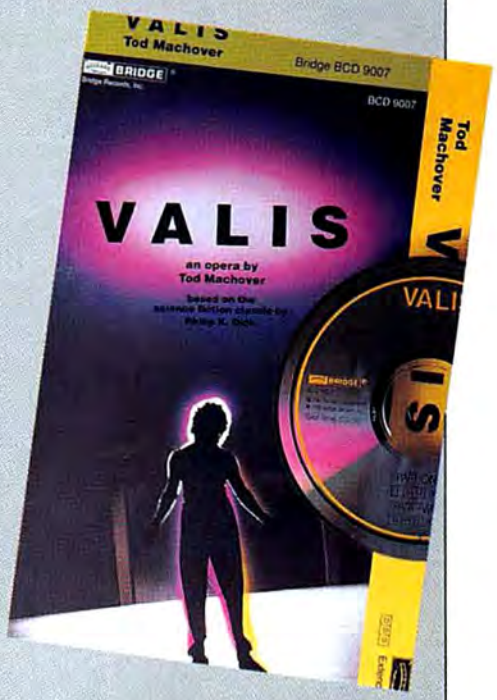
Mac-based software control is also on the way for more modest recording setups, like the Tascam 238, a new 8-track cassette multi-track recorder. At the last music industry NAMM show, a preliminary Mac software controller was on display. Rival multitrack recorder manufacturer Fostex displayed its video-event editing package, called FAME (Fostex Automated Media Editor).

tailored to meet the needs of a particular composition. A trivial example of a hyperinstrument would be the arpeggiators and auto-chord accompaniment features found on many inexpensive synthesizers. These take a single note as the input and generate a more complex — if somewhat stale — musical pattern as the output. But imagine an arpeggiator that reacted to the velocity with which a key was struck; the harder you strike, the more complex the arpeggio would be. The effect might be programmed to increase or decrease as time progresses, or it could be keyed to kick in only after a certain passage has been played. Or perhaps the arpeggios created would be based on the most recently played notes in the melody.

These sorts of musical transformations are limited only by imagination; they don't require any special hardware. Most of the hyperinstruments being developed at MIT use conventional MIDI keyboards (and other standard MIDI input devices, like percussion controllers) for both input and sound generation. The hyperinstruments live in Mac IIs, using fairly conventional programming languages such as Allegro Common Lisp and Lightspeed C. (Some of the sound processing is facilitated by the use of a digital signal-processing board developed in-house, which speeds up real-time sound transformations.) You can hear hyperinstuments in performance on a new Bridge Records recording of the science-fiction opera, *VALIS* (based on the Philip K. Dick novel), composed by Tod Machover of the Media Lab.

Hyperinstrument ensembles are also in the works. In these musical networks, the algorithms can be extended so that the output of one instrument is responsive to the input of another, to create orchestral works in which each performer is, to some extent, conducting each of the other performers. Another type of hyperensemble would divide the players' roles along functional lines. Rather than having different players playing different instruments, the players share a common instrument, with one player responsible for rhythm, another for harmony, and another for melody.

Other work at the Media Lab is focusing on real-time musically intelligent performance analysis. For example, a musically savvy computer accompanist could correctly follow a soloist, adjusting to tempo changes, covering for mistakes, and responding appropriately to the soloist's musical choices.



Hyperformance hyperinstruments can be heard in Tod Machover's science-fiction opera *VALIS*, distributed by Bridge Records.

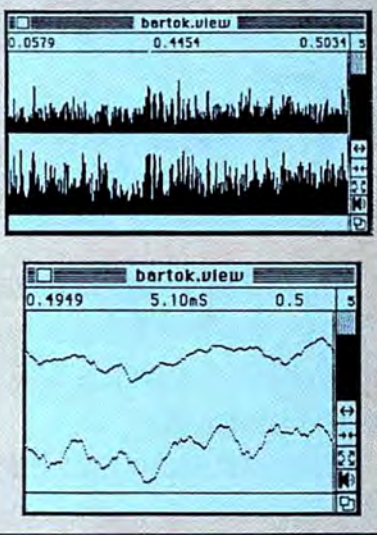
DIGITAL DOES IT BETTER

The Dyaxis from IMS is one of a small but growing group of so-called digital-audio workstations and is the only one so far to adopt the Mac II as its platform. You could think of Dyaxis as a pro-quality MacRecorder (see "Can We Talk?", June '88). A complete Dyaxis system typically sells in the $10,000 to $50,000 range, depending on the amount of hard-disk memory you need — the more memory you have, the more minutes of music you can digitize and record.

Using the system's MacMix software, you can then edit the performance with a fine level of detail — down to a single sample, if you like. The software simplifies the job of smoothly splicing different takes or snippets of sound and mixing different tracks. It also communicates with sampling software like Sound Designer and Alchemy.

Unlike the Synclavier, the Dyaxis has an open architecture based on the Mac II. (The Synclavier uses processor hardware of its own design.) At least one third-party product is in the works — SoundBase, a HyperCard database for MacMix sound files (see "Note Cards" in this issue).

The Dyaxis has both analog and digital output, letting you premaster sound for tape, CD, CD-I, DAT, and other standard formats. The system is designed primarily for music recording, but it's also being used for editing speech and for laboratory analysis of sound. For example, it's been used in psycholinguistic experiments to analyze how a baby responds to its mother's voice when various aspects of her voice are altered. It can also be used to analyze any phenomenon that generates data in the acoustic frequency range — such as earthquake and weather information — regardless of whether the data is normally audible.



The MacMix software front-end to the Dyaxis hard-disk recording system lets you edit anything from an entire song or passage down to an individual sample.









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Directory

To delve deeper into the topics and products mentioned in this article, you can use the following resources. The prices listed are for the current version of the product as of press time; some prices for new products have not yet been finalized and are subject to change. If a review of the product has appeared in an earlier issue of *MacUser*, the date is shown in parentheses.

Apple Computer
20525 Mariani Avenue
Cupertino, CA 95014
(408) 996-1010
Apple MIDI Interface; $99 (6/88)

Bogas Productions
1520 Pacific Avenue
San Francisco, CA 94109
(415) 332-6427
Studio Session; $89.95 (8/87)

Bridge Records
JAF Box 1864
New York, NY 10116
(516) 487-1662
VALIS; $17.98 (CD); $12.98 (cassette)

Broderbund
17 Paul Drive
San Rafael, CA 94903
(415) 492-3500
Jam Session; $49.95 (7/88)

Coda Music Software
1401 East 79th Street
Bloomington, MN 55425-1126
(612) 854-1288
Finale; $1,000

Computer Music Journal
Massachusetts Institute of Technology
E39-346
Cambridge, MA 02139
(617) 628-2358

Digidesign
1360 Willow Road,
Suite 101
Menlo Park, CA 94025
(415) 327-8811
Q-Sheet; $495
Q-Sheet AV; $995
Sound Accelerator; $995

Dr. T's Music Software
220 Boylston Street,
Suite 306
Chestnut Hill, MA 02167
(617) 244-6954
Level II; price to be determined

Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
(415) 571-7171
Deluxe Music Construction Set; $99.95 (6/88)

Farallon Computing
2150 Kittredge Street
Berkeley, CA 94704
(415) 849-2331
MacRecorder; $199 (6/88)

Fostex
15431 Blackburn Avenue
Norwalk, CA 90650
(213) 921-1112
FAME

Frog Peak Music
P.O. Box 9911
Oakland, CA 94613
(415) 485-6867
HMSL; $150
(requires Mach2 Forth language; $100)

GPI Publications
20085 Stevens Creek
Cupertino, CA 95014
(800) 999-9018
Electronic music glossary; free (while supply lasts)
Keyboard magazine; $23.95/year
MIDI Sequencing for Musicians, by Jim Aikin; $2.95

Great Wave Software
5353 Scotts Valley Drive
Scotts Valley, CA 95066
(408) 438-1990
ConcertWare +; $69.95 (12/87)
ConcertWare + MIDI; $149.95 (12/87)
KidsTime; $49.95 (10/86)

High Performance Systems
13 Dartmouth College Highway
Lyme, NH 03768
(603) 795-4857
STELLA for Business; $350 (6/88)

Hip Software
E15-494
77 Massachusetts Avenue
Cambridge, MA
(617) 253-0608
Harmony Grid; pricing to be determined

Integrated Media Systems
1552 Laurel Street
San Carlos, CA 94070
(415) 592-8055
Dyaxis (with MacMix); systems from $6,995 to about $50,000

Intelligent Music
116 North Lake Avenue
Albany, NY 12206
(518) 434-4110
M; $250 (10/87)
Jam Factory; $200 (10/87)
UpBeat; $150 (5/88)
OvalTune; pricing to be determined

Kinko's Academic Courseware Exchange
4141 State Street
Santa Barbara, CA 93110
(800) 235-6919; in CA, (800) 292-6640
Appletones/Mozart; $13
MacVoice; $25.50
Palestrina; $20 (tentative)

MacroMind
1028 West Wolfram
Chicago, IL 60657
(312) 871-0987
VideoWorks II; $195 (3/88)
Clip Animation, Clip Charts, and ***Clip Sounds;*** $59.95 each (8/88)
Black and White Movies; $49.95 (8/88)
HyperCard Driver; $99.95
Accelerator; $195
VideoWorks Pro; $695 (tentative)

Mark of the Unicorn
222 Third Street
Cambridge, MA 02142
(617) 576-2760
Performer; $395 (1/88)
Professional Composer; $495 (1/88)

The Media Laboratory
Massachusetts Institute of Technology
Room E15-487
20 Ames Street
Cambridge, MA 02139
(617) 253-0300

Mix Bookshelf
6400 Hollis Street #12
Emeryville, CA 94608
(800) 233-9604
or (415) 653-3307
Electronic Musician magazine; $22/year
MIDI for Musicians, by Craig Anderton; $14.95

New England Digital
49 North Main Street
White River Junction, VT 05001
(802) 295-5800
Synclavier; pricing: If you have to ask, you can't afford it!

Opcode Systems
1024 Hamilton Court
Menlo Park, CA 94025
(415) 321-8977
Cue - The Film Music System; $595
Music Mouse; $59.95 (5/87)
Timecode Machine; $300

Passport Designs
625 Miramontes Street, #103
Half Moon Bay, CA 94019
(415) 726-0280
ClickTracks; $349.95
Master Tracks Pro; $395 (12/87)

Soft-Drop
12080 S.W. Parkway
Portland, OR 97225
(503) 626-9084
"Needle-drop" music subscription service

Sonus
21430 Strathern Street, Suite H
Canoga Park, CA 91304
(818) 702-0992
7th Heaven; $79.95

Southworth Music Systems
91 Ann Lee Road
Harvard, MA 01451
(617) 772-9471
Max Audio; $995 to $1,400 per board

Spectral Innovations
292 Gibraltar Drive, Suite A-4
Sunnyvale, CA 94089
(408) 734-1314
MacDSP; $2,249

Studio Master Systems
229 Sunny Isles Boulevard
N. Miami Beach, FL 33160
(305) 945-9774
Studio Master Plus; systems from $300 to $12,500

Syn-Comp Productions
P.O. Box 6478
Champaign, IL 61821
SongBook Albums; $49.95 per volume

TEAC
7733 Telegraph Road
Montebello, CA 90640
(213) 726-0303
Tascam 238 recorder controller

Verbum
P.O. Box 15439
San Diego, CA 92115
(619) 463-9977

Warner New Media
3500 Olive Avenue
Burbank, CA 91505
(818) 955-9999
CD + MIDI

Words & Deeds
4480 Sunnycrest Drive
Los Angeles, CA 90065
(213) 255-2887
Archie; $795

The following organizations may also be of interest:

Center for Computer Research in Music and Acoustics
Stanford University
Stanford, CA 94305
Research center

The Center for Electronic Music
432 Park Avenue South
New York, NY 10016
(212) 686-1755
Nonprofit educational and production center

The International MIDI Association
5316 W. 57th Street
Los Angeles, CA 90056
(213) 649-6434
Publishes MIDI specification

IRCAM
31, Rue S. Merri
75004 Paris, France
Electronic music and acoustics research center

Macintosh Entertainment Guild of America
1032 North Sycamore Avenue
Hollywood, CA 90038
(213) 653-0240
Interdisciplinary artists association

Performing Artists Network (PAN)
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4Z304



The Producers

The Mac may not be on Hollywood's A list, but there are more production tools out there than you might think.



Orson Welles once said that a poet needs a pen, a painter a brush, and a filmmaker an army. Welles' quip is still apt, but today it would probably be more appropriate to give the filmmaker an army and a computer. While the enlightened might think that the computer should by definition be a Mac, Hollywood still hasn't seen the light. In the industry, DOS still receives top billing, and the reasons aren't without merit. Most of the studios are on mainframes, the Mac is much more expensive than a PC clone, and there is no true Mac portable to take on location. But in spite of these facts, the Mac is making inroads. A sufficient number of software publishers have come forward with Mac products that people considering using a Mac in a production should be able to find an application to fit their needs.

IF IT AIN'T ON THE PAGE

Every production starts with a script, thus the familiar Hollywood

BY RUSSELL ITO



MEL LINDSTROM

chestnut: "If it ain't on the page, it ain't on the stage." Computers are great at word processing, but unfortunately, not so great at screenwriting.

Screenplays have their own unique conventions, and since a producer measures screen time by page count (one page roughly equals one minute), those conventions must be observed. For example, a page break should never split a character's name from his dialogue, but at the same time, you don't want to carry everything over to the next page, since the pages should be as full as possible. Intelligent page breaking is something word processors don't do, and that's where scriptwriting tools come in.

DIRECT FROM PARIS

CineWrite, from Parisoft, is a French program being distributed in the U.S. through Max3. It's an integrated word processor and quasi-presentation tool that lets you write a script and then combine storyboard frames with the text for presentation purposes.

As a word processor, CineWrite handles the two basic types of screenplay: feature (single column) and video (two columns). It comes with predefined formats for both Europe and the U.S., and these can be modified if desired. You can also create your own formats. CineWrite's formats, however, are linked to a script, so they can't be saved independently. This is an inconvenience if you're offering the same material to several producers or studios, each of whom has his own particular format.

One of the problems of writing a script in a word processor is that every element — scene description, character names, dialogue, and so on — has its own margins, and the text has to wrap within them. CineWrite's approach to this is, well, unique. You format your script as you write it, using a combination of keyboard entries and a series of glossaries. For example, to switch from the scene description margins to the dialogue margins (and vice versa), you type Command-Spacebar. To get from the dialogue margins to the character margins, you then hit two tabs, and to get from the character name to a parenthetical instruction, you hit Return and a tab. It works, but there are so many keystrokes involved that it's almost as bad as typing everything on a typewriter. The addition of a macro utility like QuicKeys and an extended keyboard improves the situation somewhat.

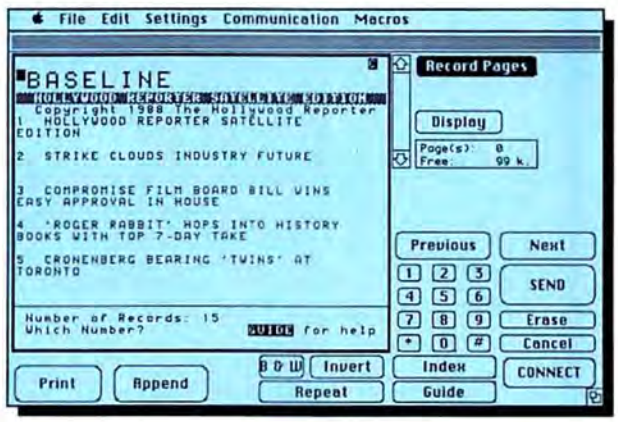
CineWrite tries to offer some shortcuts for repetitive typing with its glossaries. There are five of them, with up to ten entries in each. There's a glossary for slug lines (*Ext. Xanadu — *), character names, transitions (*Dissolve To:, Fade Out*), atmospheres (day, night, evening), and a main glossary for whatever you want. The problem is that it's difficult to remember what's where, because the entries are invoked by number (for example, number one in the Character glossary might be *Charles Foster Kane,* while the same number in Transitions might be *Fade In*). The manual suggests you print all the lists so you can refer to them while you're writing. But the process should be more intuitive than that.

The procedure for video scripts is essentially the same, except that the text appears on-screen in two columns. Unfortunately, the right column is one line down from the left column, just as it is in Microsoft Word. This discrepancy disappears on the printed script.

CineWrite does handle intelligent page breaks, inserting *Continued* at divided scenes and *(More)* at the end of split dialogue. But in both examples that I ran, the program made mistakes on the succeeding pages; in feature mode, it positioned the character name incorrectly, and in video, it dropped a line space.

CineWrite also provides a simple presentation module that lets the user assemble storyboards with or without the appropriate sections of text. The storyboards can then be sequenced into a slide show or printed out. There are no drawing or painting tools available from CineWrite, so graphics must be imported from another program. Templates for the standard aspect ratios are supplied, however, and the sequencer offers a number of basic visual effects for transitions between boards.

CineWrite also imports scripts created in other word processors but ac-



This list of stories is taken from BASELINE's satellite edition of the Hollywood Reporter. BASELINE is an on-line service that can keep you up to date on who's in production, what hot literary properties are out there, and the latest industry news.

Too Late for Review

Two products would have been included in this roundup, had they arrived in time: Storyboarder and Scriptwriter, both from American Intelliware.

Storyboarder is no stranger to these pages, and its last mention was in Douglas K. Dempsey's article on storyboarding, "Once Upon a Board," August 1987. In a sidebar to his article, Dempsey wrote of Storyboarder: "It has a limited paint program. It has a good sequencer, with lots of editing and effects. But you can't design your own templates, the interface is confusing, and there have been some serious complaints from professionals about its reliability."

American Intelliware has established a reputation in the production industry, and we will review their programs in a future issue.

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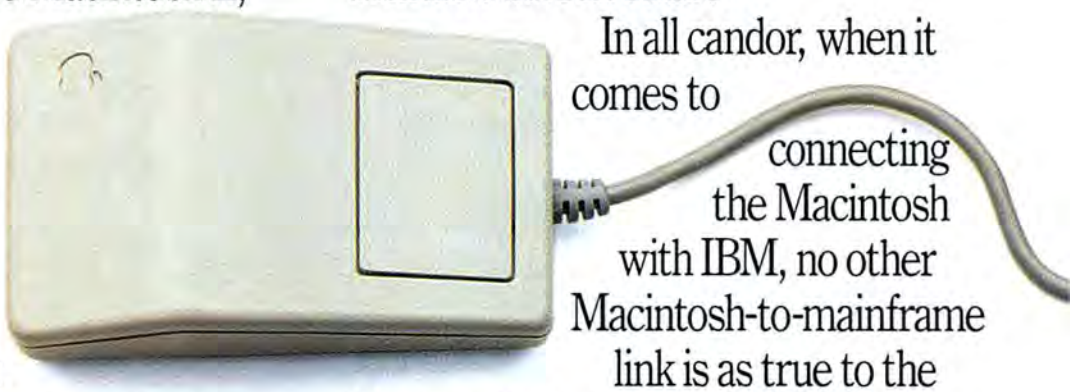
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For the authorized MacMainFrame dealer or distributor nearest you, call 1-800-289-2526, ext. 27. Or write Avatar Technologies, 99 South Street, Hopkinton, Massachusetts 01748.

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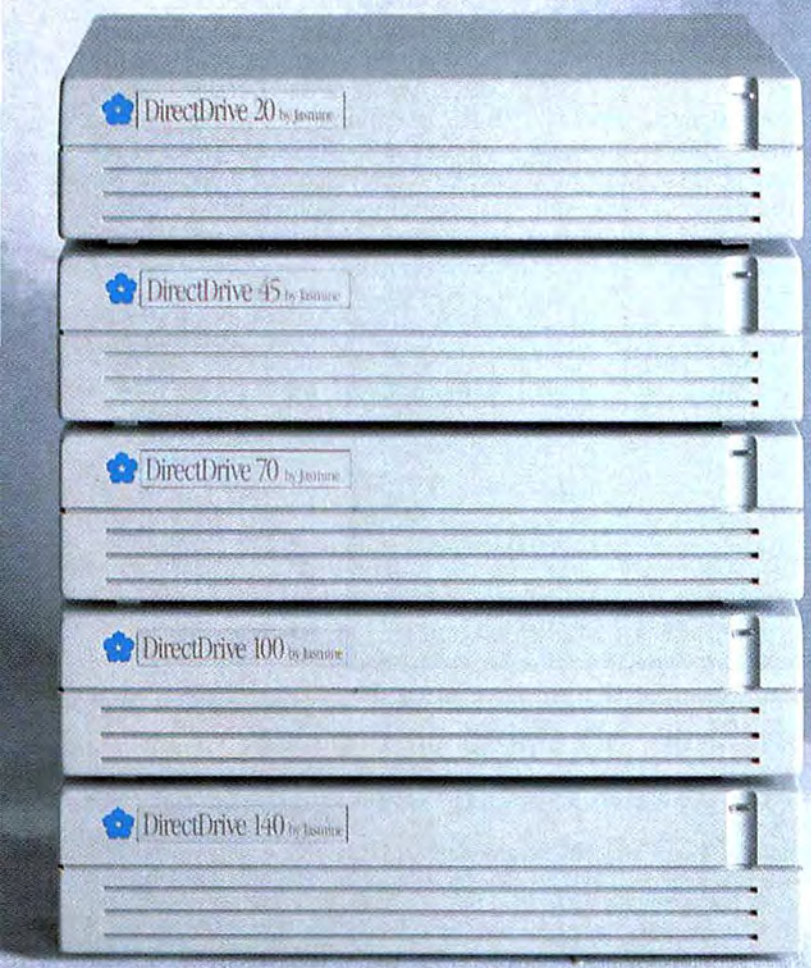
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The Producers

cepts them only as text with tab stops — bad news for anyone who writes in Word with style sheets. To import a Word script, you have to save it as a text file and then add all the tab stops CineWrite requires — no small task in a 120-page script.

DIRECT FROM BURBANK

Scriptor, from Screenplay Systems, is a unique tool in that it isn't a word processor, but rather a formatter. It takes a single-column script written with Word, applies a consistent format to it, and performs all the necessary intelligent page breaks (it doesn't support two-column video format). Formats (Scriptor calls them *layouts*) can be created and saved without being attached to a script, so you can build a library of them. Scriptor can also generate a simple script report, which lists each scene, its title, the page it begins on, and its length in eighths of pages.

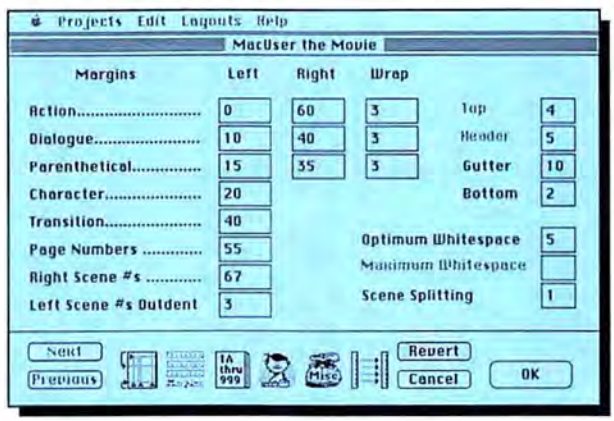
Since its introduction, Scriptor has become something of a standard among Hollywood professionals, but it isn't perfect. The current version still doesn't support the hierarchical file system (HFS) or proportionally spaced fonts — limitations that Screenplay Systems says will be corrected with the next release. Nonetheless, it does its job well, and it's relatively easy to use.

SOOTHING THE SUITS

In any production, at least part of the struggle involves satisfying the accountants. Budgeting has always been the bane of production, because the process was so time-consuming, but computerized budgeting has eliminated most, if not all, of the drudgery.

Currently, there are two programs for Mac budgeting: MacToolkit Production Budgeter (Max3) and Movie Magic Budgeting for the Macintosh (Screenplay Systems). These programs take similar approaches.

A movie budget is usually structured in a three-tier hierarchy: the Top Sheet, Accounts, and Details. The Top Sheet is a summary of all the underlying accounts, with each group of accounts represented as a single line. For example, Production Staff would show



In Scriptor's Margins window, you can set your script's layout precisely. The six icons along the bottom give you access to the other available formatting windows: Blueprint (a graphic representation of the layout), Margins (currently active), Scene and Page Numbering, Headers and Footers, Miscellaneous Options, and Margin Moving.

Hold on, My Data's on the Line

If *Daily Variety* isn't getting you the scoop fast enough, maybe you should look into an on-line service.

BASELINE is an on-line service that provides information on credits, what's in production, literary properties, contacts, box-office grosses, and even a satellite edition of the daily *Hollywood Reporter*.

And for those who don't like paying for their on-line services, there's VIDEOMAN, a free, public-access, remote computer system that includes a BBS and also the MEDIA-MAN DATABASES, which provide information on hardware, people, production services, and more. Users who contribute $25 get access to additional directories and longer log-on periods.

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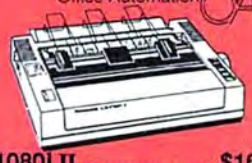
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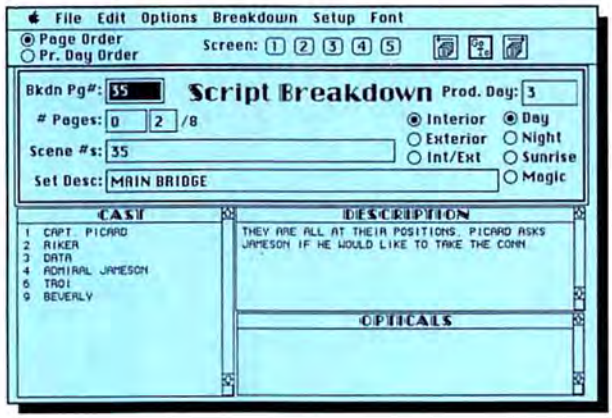
a total for everyone in that category. The Accounts comprise the second level. Here, the total group of, say, Production Staff, is broken down into its individual accounts: Production Manager, First and Second Assistant Directors, and Script Supervisor. The lowest level of the hierarchy, the Details, is where the actual figures are entered. At this level, each individual's pay rate, hours, benefits, taxes, and so on are entered and calculated. Any entries or changes made at this level trickle upward through the budget, updating everything else.

Since no one ever knows how much it will actually cost to make a movie until well after the project is finished (and sometimes not even then), MacToolkit and Movie Magic let the user play those very important "what if" scenarios up front. If you needed to know how much it would cost to shoot a film in Toronto versus New York, you could do separate budgets for each city, but MacToolkit and Movie Magic make that unnecessary. Both let you create one budget with suppressible lines. So you can toggle back and forth between your options just by activating one set of figures and suppressing the other.

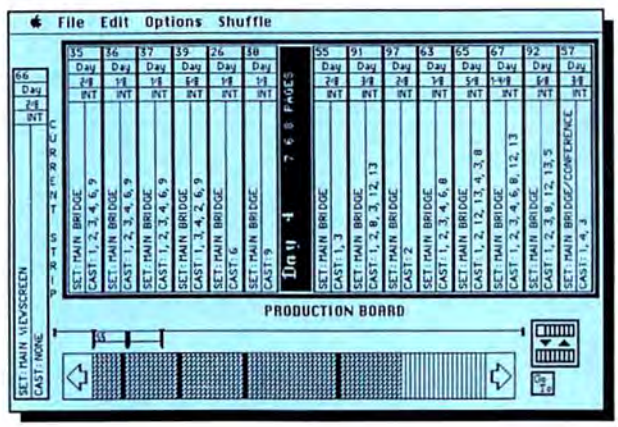
Both programs perform essentially the same functions, but Movie Magic appears the more stable, and therefore preferable, of the two. MacToolkit does not have an Undo function, and it bombed on me when I was performing some seemingly simple and innocuous tests. Movie Magic has a much more elegant interface, but where it wins big is in two features that MacToolkit doesn't offer: definable data Libraries and a simple macro-making capability.

When creating budgets, you'll often find yourself repeating data, especially things like labor rates. Movie Magic lets you copy and save these repetitious lines to a Library, or glossary, that is independent of the originating budget. Once saved, these Libraries (you can have as many as memory allows) are accessible from any other budget you create.

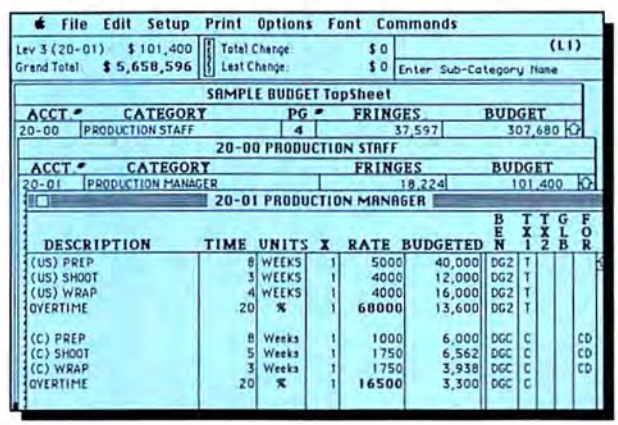
The macro function, called Magic Keys, lets you define a Command-key equivalent for a set of Fringes (benefits) or Subgroups (detail lines) that you use all the time. Again, the goal is to eliminate repetitive data entry.



The breakdown starts here. This is the first screen in MacToolkit's breakdown page (you can have up to five screens that are accessible via the buttons in the top row). The information in the Script Breakdown box and Cast window will be condensed on the strips.



MacToolkit's scheduling package emulates the look of a production manager's stripboard. Breakdown page 35 is represented by the first strip on the left in the Production Board. The Current Strip field holds the next strip for pasting into the board, and the graphic at the bottom represents the entire schedule.



MacToolkit's budgeting package structures your budget as a three-tiered hierarchy. The active window is the detail level, the next window back is the category level, and the last window is the top sheet.

WE'RE SHOOTING WHAT, WHEN?

At this writing, the only scheduling program available was the MacToolkit Production Scheduler (Max3) — although, by the time you read this, Screenplay Systems will probably have released its package as well. (See sidebar, "Scheduling Magic.") This package is a companion to the MacToolkit Production Budgeter and performs the two basic operations involved in scheduling: script breakdown and production scheduling.

Script breakdown is performed manually. All essential script information — the number of script pages per scene, the scene number, set description, interior/exterior, and day/night — is entered in the first screen's first field. MacToolkit lets you have five

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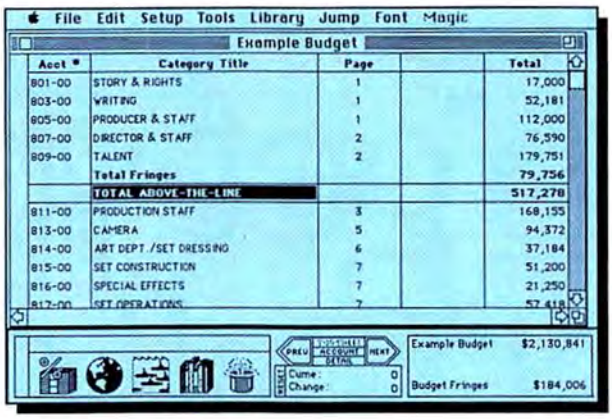
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The Producers



Movie Magic's budgeting program has a slick interface. This is the top sheet. The icon palette at the bottom lets you set fringes, set up globals and subgroups, view data libraries, and apply Command-key equivalents.

screens, with up to 20 windows in each, per breakdown page. The windows are used for listing additional information, such as cast, props, special equipment, animals, costumes, and effects.

These windows are text fields into which you can enter data directly, but the Cast window is one that you really shouldn't use in that way. To make sure that the cast is properly accounted for, the total cast list should be compiled in the Character List dialog box from the Breakdown menu. In this dialog box, each character is assigned an ID number and name. The ID number is important, because when the program builds the production board strips, the numbers — not the names — are used to identify who's on call when. One problem I encountered was that the program doesn't prevent duplicate names or ID numbers. So just like Santa, you had better check your list twice.

Once the breakdown has been entered, you can create the strips for the production's stripboards merely by invoking a single command. Traditionally, stripboards have been the production manager's Bible. These hinged pieces of wood covered with leather (or vinyl), with strips of colored cardboard carefully arranged and secured to them, provide the production manager (PM) with an immediate, visual breakdown of the shoot's schedule. As

Scheduling Magic

By the time you read this, Screenplay Systems should have released their long-awaited scheduling program, Movie Magic Scheduling/Breakdown. The company demonstrated it at the recent Show Biz Expo in Los Angeles, and it looks like an extremely powerful tool.

On the breakdown side, Movie Magic automates and simplifies much of the tedious data entry that breakdown usually requires. It can take a Scriptor-generated report and automatically load the scene numbers, headings, and page counts. All the fields in the breakdown are on one screen, and they can be accessed via an icon palette. When you enter elements by hand, the program automatically retrieves and enters unique text strings based on only a fraction of the element's full name. This is a real timesaver when you're repeatedly using the same locations, props, and so on.

The stripboard mode is in color, and it's graphically oriented so you can actually drag the strips around on-screen. Movie Magic will print to a laser printer. If you use Screenplay System's perforated strip paper (called *Striperf Paper*), the strips can then be slipped into clear, colored, plastic strip holders (called *Striperf Strips*) that provide standardized colors and fit into traditional stripboards. The printed strips also have bar codes on them, so that if the strips are rearranged on the set, all the PM has to do to update his or her Mac is to run a bar-code reader over the codes.

Movie Magic Scheduling/Breakdown will be the first program from Screenplay Systems to feature their Macintosh Compatibility Package, which lets DOS users have the same functionality as their Mac compatriots. There's more to say about MCP, but you'll have to read New on the Menu to find out the rest.

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"low tech" as it may seem, these boards are still the standard, so it isn't surprising that MacToolkit reproduces the look of a stripboard in its scheduling mode.

The information on each strip is loaded directly from the breakdown, and the strips are then placed onto a representation of a stripboard. Available strips are cut and pasted into the final board, where they can then be rearranged by cutting and pasting. MacToolkit will also sort and place the strips for you. So if your star will be available only for the first half of the shoot, you can automatically pull all the strips with the star's ID number in the cast list and schedule them first.

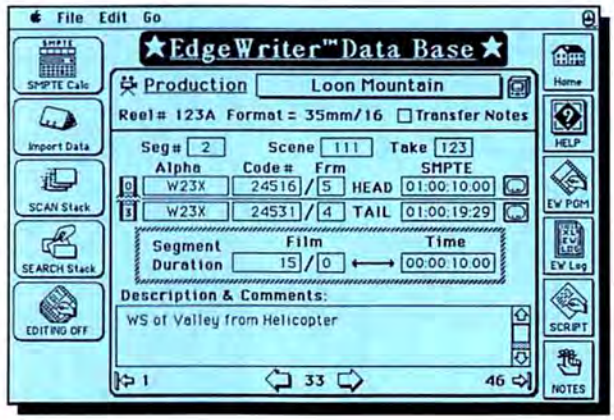
Although it did bomb on me twice, MacToolkit did do what it was supposed to do. But it does have limitations. First, the current version doesn't support color, so the kind of standard color coding PMs use for things like interior/exterior or day/night isn't possible on screen. Second, to put the printed strips into an actual stripboard that a PM can take to the set requires the use of some colored label stock that has to be pressed onto actual strips. And third, there's no provision for automatically rearranging the schedule on the Mac if the PM has to adjust the schedule on the set. Once the strips are moved on the board, someone has to sit down at the office and laboriously match the Mac to the board by hand.

THE MAC ON THE CUTTING ROOM FLOOR

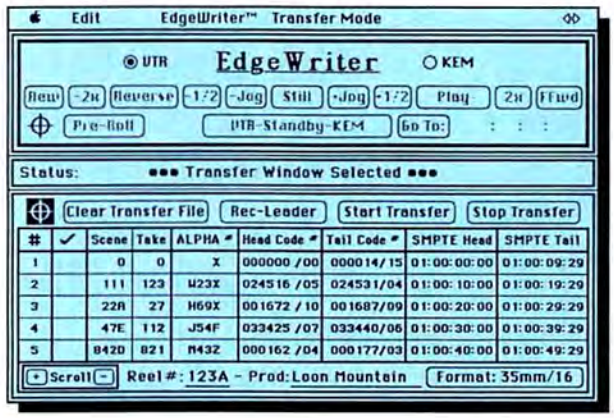
Once your footage is in the can, the Mac can help you with your editing. If you're cutting on video for a final video composite, there's Edit Lister. If you're transferring from film to video for editing and back to film for the final release, there's EdgeWriter.

Edit Lister, from Comprehensive Video Supply, is an off-line edit-list manager that will compile a list of all your SMPTE time-code in/out points. This list can then be dumped directly into an on-line system, such as a CMX. To get the time-code numbers into Edit Lister, you can either enter them by hand from a window dub (a copy of your original footage, with the time-code numbers superimposed on the image in their own window) or you can connect your Mac to an off-line system and have the off-line suite enter them automatically while you edit. This is obviously the preferred method, and the Mac can be connected to the editing system via an RS-232 cable. Pin diagrams are provided in the manual if you want or need to build your own.

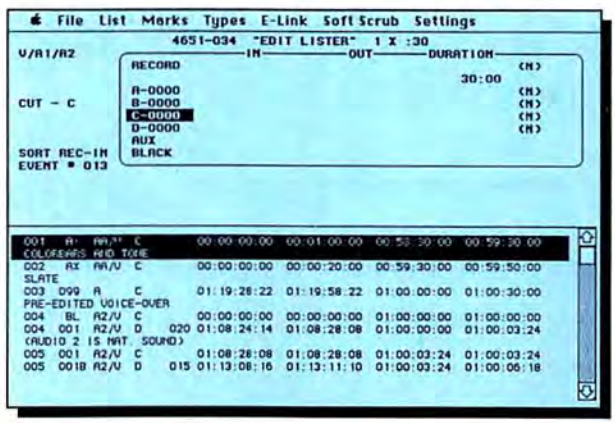
For those who need telecine conversion, there's EdgeWriter. The problem for people who shoot on film, edit on video, and return to film for their final compositing is that frame-accurate sync is hard to maintain. Transferring from 24 frames per second (fps) film to 30-fps video (NTSC) and then back to 24-fps film entails some pretty ugly calculations. EdgeWriter was designed to solve this problem. Unlike the other products mentioned here, however, EdgeWriter involves both hardware and software, so it's definite-



EdgeWriter's frame data can be dumped into a HyperCard database for easy access. Each shot gets its own card, listing (among other things) its edge numbers and corresponding SMPTE time codes.



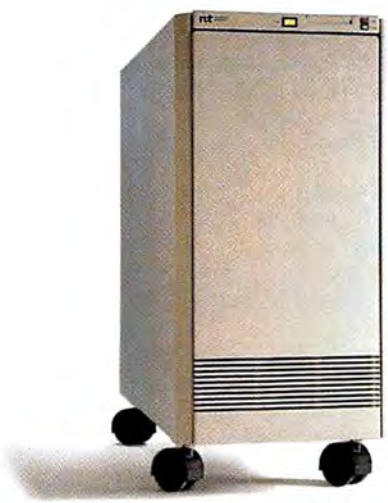
24-30-24. No, those aren't Miss America's measurements, they're the frame rates you have to pass through when going from film to video and back to film. EdgeWriter can control your transfer and keep you in frame-accurate sync all the way.



It doesn't win any points for looks, but Edit Lister will compile an on-line compatible list of your off-line video edits. The box at the top lets you specify the sources and in/out points. The scrolling list at the bottom is the actual edit-list data.



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The Producers

ly not for the faint of pocketbook.

EdgeWriter starts the telecine process with someone (usually an assistant editor) entering the original film's edge numbers into a specially prepared Excel spreadsheet — the same job that that assistant would have performed anyway, except the numbers are being entered into a computer and not a log book. The film and the mag sound are then synchronized on the telecine, and the edge numbers are loaded into the EdgeWriter. The Mac now becomes the telecine's controller, and you can start and stop the transfer or just transfer selected shots. EdgeWriter writes the edge numbers into the video as it controls the transfer. When the edited video comes back, the film edge numbers can be recovered and printed out as a list for the workprint and negative cutters. And in case they've forgotten where all those shots are, EdgeWriter also has a HyperCard database that imports the data right off that original Excel spreadsheet and gives each shot its own card.

CALL IT A WRAP

Even with all these packages, the Mac still isn't playing leads, but it is gaining in popularity. While your software choices are still limited, there are enough products to cover you from writing to post-production. True, copy protection (boo, hiss) is *de rigueur,* and none of these packages is cheap. But the cost of buying a few of them to go with your Mac will be a lot less than hiring an army and, in the end, probably a lot more effective.

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Simpler Samplers

Is it live or is it MIDI hex? Only your sampler knows for sure.

In the world of music performance and recording, the 1980s have belonged to the digital sampler. From the rep-, rep-, repetitious lyrics of rap to the techno-babble of Max Headroom, the technology of digital sound sampling has been at center stage since the decade began.

Sampling is the practice of recording, processing, and playing back acoustic sounds with an electronic device called, of all things, a sampler. Samplers have all kinds of built-in microcircuitry, but they become even more powerful when hooked to an independent computer. Sound waves can be represented in a number of graphical formats to make them easier to work with, so the Mac's interface makes it the ideal partner for any sampler. If you're new to sampling, the sidebar "Connecting the Dots" provides a basic introduction to the concepts involved.

The evolution of sampling has progressed as a dialectic, a tension between two technological and economic poles, each moving gradually toward the other (see the sidebar "A Sampler Sampler" for a history of the origin of the various sampler species). The Macintosh has been involved with sampling for a while, but now more than ever it's playing some of the key passages in this movement, and therein lies a story.

BY TIM TULLY

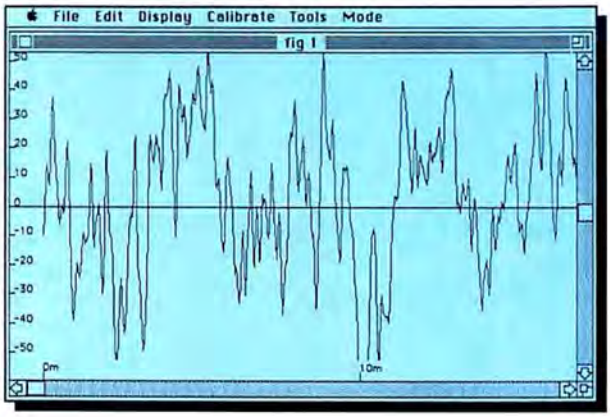
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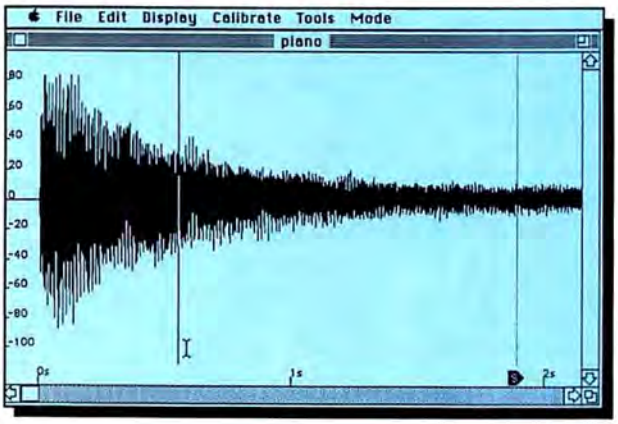
The first successful Macintosh sample-editing program to come onto the scene was the aptly named Sound Designer, developed by the California-based Digidesign. Originally, there were separate and incompatible Sound Designer programs for each of the samplers it supported, but the latest version supports most of the samplers currently on the market.

Sound Designer loads a sample from a sampler into the Mac's random-access memory (RAM) and displays it in either of two different graphic formats. While the sample is in RAM, the program provides the tools to do any tailoring one could wish.

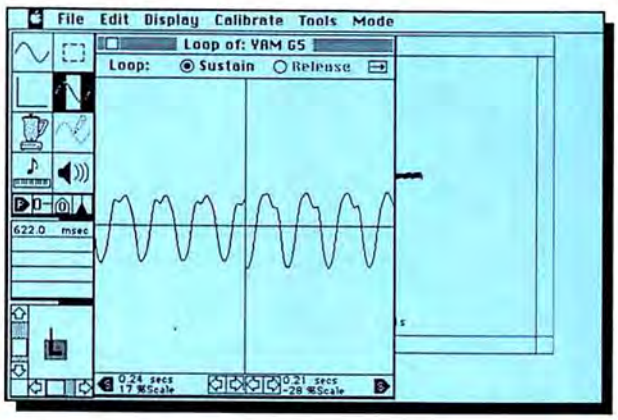
Truncation, for example, is one of the first operations most samples need. Even carefully taken samples usually include a certain amount of silence recorded at their beginnings and/or ends. Since memory is always at a premium, and since you want to control how soon your sample starts and stops after you hit or release a key, you'll want to snip off these silent heads and tails. While most samplers include a truncation function, finding the exact byte that exists at the border between silence and sound is difficult. Typically the budget sampler handles this by presenting you with a series of numbers — byte values — on its liquid-crystal display. You scroll through these, one screen at a time, until you find one that looks different enough from the last (or next), whereupon you delete the part you hope is the garbage, play the sound to see how close you came, and so on. At the end of a session spent editing samples this way, one usually attributes a new and near-religious meaning to the concept of trial and error.



This might be a complex sound wave displayed in Sound Designer. Then again, it might be a day in the life of a California seismograph.



Most musical instruments (like this piano sample displayed in Sound Designer) have complex wave forms that show distinct attack, sustain, and release stages.



The Sound Designer loop-splicing features let you fix mismatched looping points (like the ones shown) that would otherwise create unwanted noise.

> At the end of a session spent editing samples, one usually attributes a new and near-religious meaning to the concept of trial and error.

Load a sample into Sound Designer, however, and it displays the waveform of the whole sample on an x,y-axis. Once you've used this overview to get a general idea of the area you want to change, you can zoom in to see detail as fine as an individual period of a sound wave. It's a snap to find any part of the sample with a map like this. Once you've found the beginning and end of the silence (or any other part of the sample you don't want to keep), ordinary Mac select and cut procedures will get rid of it.

The second principal way to edit a

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sample is to "loop" it. Another memory-conserving trick, looping also lets you control how long a sampled note sustains when it's played. Think of a note played on a keyboard as being divided into three parts: attack, sustain, and release. The attack is the very beginning of a note, governing how quickly the sound rises to its volume or full harmonic richness after you hit the key. For example, a plucked string or an organ note attacks immediately, a piano a bit slower, a bowed string slower yet. Sustain is what the sound does while you hold the key down: an organ will sustain forever, a piano will gradually die. Likewise, the organ note stops as soon as you release the key, the piano decays more slowly, and so forth. To make sure your sampled sound sustains exactly as long as you want, you can find a short section of it following the attack, and tell the sampler to loop that section — to play it over and over again — until you release the key, at which time it plays the tail you've set.

Unfortunately, musical sounds nearly all change continuously as they sustain. (Well, it's fortunate for the music, but it makes sample editing tougher.) As a result, finding the right section to loop is the event that holds the record for prematurely ending the careers of most potential samplists. The auto-looping functions built into many samplers are not known for ease of use or success rate, but the looping windows in Sound Designer make it easy to find compatible beginning and ending loop points whose amplitude, phase, and other attributes will make the loop sound smooth and musical.

Crossfade looping functions help even more. With just a few keystrokes, you can fade a loop's crossing points up and down in volume to smooth things further. These techniques produce essentially flawless loops and let you do it downright painlessly.

Sound Designer also offers a paletteful of such functions as mixing two or more samples to play simultaneously; merging two samples (letting you create, for example, a sound that has the attack of a trumpet and sustains with the sound of a cello); and using a pencil to redraw any part of the sound wave. A digital parametric equalizer accurately shapes a sample harmonically, and a Fourier transform function lets you analyze a wave as a group of frequencies and their envelopes, instead of as an amplitude changing over time.

Sound Designer set a standard for flexible, functional, and stable sample-editing software. This development put major might into the Mac-based, modular sampling system. A rewritten version is in the works that should, if past is prologue, be another giant step for samplekind.

Connecting the Dots

Just what, the generally-well-informed-yet-techno-musically-innocent Mac user might well ask, is a sampler? How indeed does a computer record music? These are good questions.

A sampler is essentially a computer that records and plays back sound waves. To make sense of this, we need to know a bit about the ways sound waves function, so hang on for a little cyber-acoustics.

When an object — say a piano string or a loudspeaker cone — vibrates, it continuously compresses and decompresses the air around it, creating a wave or series of peaks and valleys, like those in a puddle after you've tossed a stone in it. When the wave hits our ears, we perceive it as sound. The faster the peaks and valleys come (that is, the higher the wave's frequency), the higher-pitched the sound sounds; the taller the wave's peaks and the lower its valleys are, the louder it sounds. Different wave shapes (sound waves can be shaped like anything from the smooth rolling curve of a sine wave to the printout of a politician on a polygraph) produce different timbres, or colors.

Sound waves — like all waves — exist as unbroken, continuous events: The air gets compressed and then decompressed in one uninterrupted motion. This is an analog event. We can represent that wave as a series of numbers — a digital event. This can be graphically displayed as a connect-the-dots picture showing numerous individual events; with enough dots, the image starts to look like a continuous line, or the original analog event. If you're still with me, there's only one more piece of esoterica to go.

A microphone converts a sound wave into a continuous electrical current that has frequency, amplitude, and shape that are analogous to the sound wave. It can send that current to an analog-to-digital converter (ADC), which measures the amplitude of the wave at a number of given instants and generates digital data representing the measurements. Each measurement is a *sample* of the wave, and the number of measurements taken per second is the *sampling rate*.

This series of samples effectively represents the analog event in a digital form that is recorded in a computer. Then, through a digital-to-analog converter (DAC), the sampler's internal computer can turn these numbers back into an electrical current that, when pumped through something like your stereo system, can again become a sound, more or less identical to the original. If the sampling rate is fast enough — that is, if the dots are close enough together — your ear won't know the difference.

Digital, as opposed to old-fashioned analog, recording has lots of benefits. With powerful enough hardware and software, the quality of a digital recording can beat the pants off most analog recordings, compact discs being the most familiar example. More to the point here, though, is that the digital nature of a sampled sound is as protean as you can get. Sample a pitched sound, say a piano playing middle C, and play back the samples at a slower rate than the one at which it was sampled, and bingo, you get a note pitched below middle C. Play it back faster, you hear a higher note. Build a sample playback machine with a piano-style keyboard

TURBO POWER

Turbosynth is a new program from Digidesign that gives jaded sampler-players a way to create samples with a combination of contemporary digital technology and early synthesizer concepts.

Many of the original synthesizers (the best-known being the Moog and Arp instruments of the '60s and '70s) were modular; they used a collection of

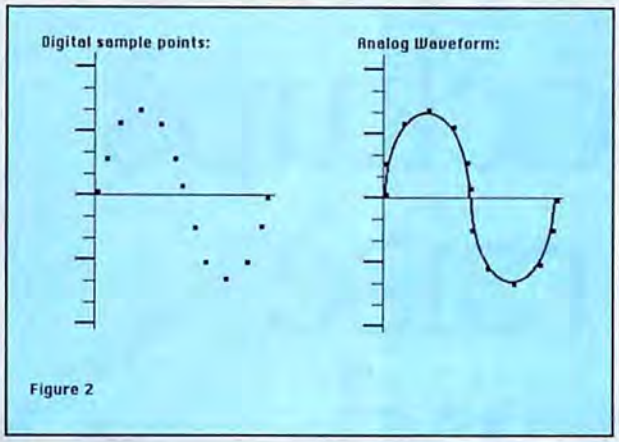


Figure 2

An analog sound wave can be represented in digital "connect-the-dots" form. If the dots are close enough, your ear won't know the difference.

that triggers playback at various rates, and you have a device that can play any sound in the cosmos from a keyboard.

But that's just the start. We now have the situation quite familiar to the computer-literate: we've turned a real-world (analog) phenomenon into (digital) computer fodder. Like words in a word processor or numbers on a spreadsheet, once we've got that data digitized, we can use software to do anything we want with it: Run it backward, run it forward, delete pieces, repeat pieces, add two together, thin it out, fatten it up, and so on. That's why a graphics-oriented computer like the Mac can be a sampler's best friend; you can add new features and innovations without having to buy new sampling hardware.

It's not just the flexibility but also the quality of sampled sound that makes musicians froth at their collective mouths. The sounds of synthesizers (the "other" electronic instrument) have improved continually from the beginning of their history. But in the early '80s, their sound palettes still seemed somewhat limited and wooden, so the idea of being able to load just one magic box with a "real" piano and a "real" violin — not to mention one's favorite tire screeches, James Brown hollers, and the complete works of Curly, Larry, and Moe — was an offer no electronic musician could refuse.

Since they're computers, samplers work well or poorly for the same reasons as any processor. One needs RAM and a nice wide bit path — more is always better in both cases. (In sampling, this adds up to more and/or longer sounds.) Processing speed and power are helpful, too; and of course, the right software, both systems and applications, has to be developed (usually slowly) to let the user get at the data and push it around. So, like any other computer, samplers started off big and expensive, then got smaller, less expensive, and more capable.

electrical circuits — one or more oscillators to create a waveform and a number of other kinds to modulate this waveform in sundry ways — to build up a natural- and musical-sounding tone. None of these circuits (modules) were connected unless the player used a patch cord to hook them together. Imagine a program that does this, but with software and all in the digital domain. Add a few new twists, and you've got the basic idea behind Turbosynth.

Basic sound-generating waveforms are represented in a window by an icon and can be reshaped by ten preset tools that modulate, stretch, soften, amplify, compress, and otherwise mold the sound, which is then linked, using a patch cord tool, to any of twelve modules. The shaped, modified, and modulated waveform is routed, finally, to the mixer tool, which combines everything digitally into one wave. This wave can then be dumped to any of ten samplers currently on the market. It can then be played just like a "real" sample.

Although the modular concept is an old idea, Turbosynth includes a number of functions that no Arp 2600 ever had. In addition to the 15 on-board synthesizer-type waveforms, you can use any Sound Designer sample or draw a wave with the pencil tool. You're not restricted to using just one waveform, either. Turbosynth lets you string a number of waves along a timeline so that, when triggered, the sound will crossfade smoothly from one into the other according to the time you specify. This directly combats one of the more durable *bêtes noires* of both sampled and synthesized sound: the static waveform. To be perceived by humans as musical, a sound usually needs to evolve harmonically over time.

While most acoustic musical instruments produce tones that have this quality, it takes a lot of circuitry and memory to create this effect electronically. This is one of the reasons synthesizers can sound flat or wooden, and over the last few decades, a good deal of research and development have gone into overcoming this limitation. Turbosynth's Crossfade function not only can create a waveform with the subtle harmonic changes of a natural sound but also lets you invent a wave that evolves smoothly from one sound into a completely different one; a trumpet attack might sustain with the sound of a violin, then decay with a piano sound.

The waveform can be patched through various modules, including envelope generators for both filter and amplitude and such digital signal processing as delay, pitch shifting, and modulation to add flanging, chorusing, echo, and other common effects. More arcane modules shape a wave according to different preset or pencil-drawn scales or stretch it with a resynthesis algorithm. My personal favorite, the Spectral Inverter, flip-flops the low-frequency components of a wave with those of the higher half to create effects that seem to vary with the nature of the sound. This digital doodad generates effects that are not quite like anything else and have to be heard to be appreciated.

The program also offers a powerful

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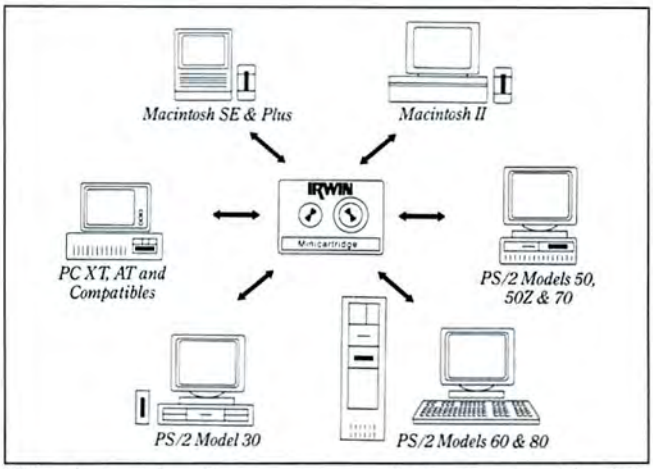
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looping function, much like the one in Sound Designer, whereby a pair of markers define the beginning and end of a loop and display them in adjoining windows to help find compatible loop points. What's more, in addition to its normal functioning, a loop can itself be extracted and used as a sound-generating waveform.

TRANSMUTE 'N' COMPUTE

Alchemy is the new player from Blank Software. The manual says the program is "the first universal stereo sampling editing network and because of that it's revolutionary in many ways." While the people at Blank Software have done their homework quite assiduously, and the program has a whole lot going for it, I'm not so sure about "revolutionary." In fact — to invoke a cliché — Alchemy is not so much revolutionary as it is evolutionary. The program owes a debt to Sound Designer; many of its features and operations are similar or identical. This isn't meant as a denigration; the graphics conventions both programs use to display sound waves are standards of acoustic physics and weren't invented by Sound Designer any more than were the kinds of editing that samples require. That Alchemy uses concepts, visuals, and functions proved effective by prior efforts is to its credit. Even more so are the enhancements it embodies.

Alchemy first displays a waveform on a time and amplitude x,y-axis, where, by selecting all or part of the wave, you can cut, copy, paste, delete, and reverse the selection. The Clipboard contents can also be mixed with the contents of the open window (so both sounds play at once), with a feature allowing alignment of either the beginnings or ends of the waves being mixed. The Extract feature facilitates truncation by deleting everything except the selected section.

GRAND SAMPLE STATION

Alchemy bills itself as the communications and storage hub of a network of samplers: DAN, the Distributed Audio Network. Version 1.01 supports the Akai S900, Ensoniq EPS and Mirage, IMS Dyaxis sample-to-disk system, and E-mu Emax and SP1200 (Emulator III support is forthcoming). One might suppose that the simultaneous presence of even two of these units presupposes that the software is being used in a high-end recording studio. But the network approach also lends a flexibility to "the rest of us," working with but a single sampler. Alchemy's ability to load a sample from nearly any sampler, edit it, and then send it to any other sampler is a blessing to anyone looking to upgrade to a better sampler, or for the occasional project where using a different instrument is necessary for any of the usual reasons: better quality, convenience, or the insistence of a client.

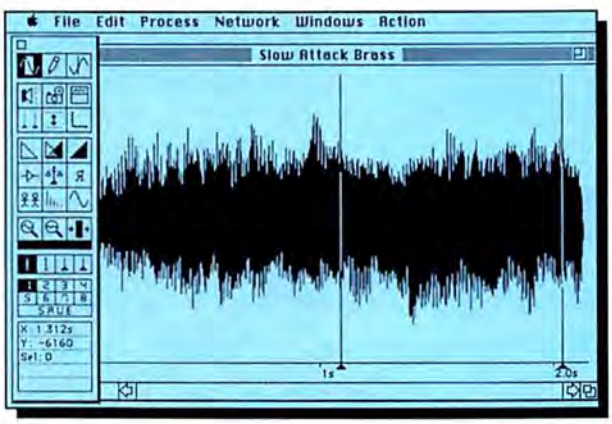
Alchemy's tool palette resides to the left of its windows. It's a nonstandard palette in that it's always visible, covering up part of even the active window if it impinges on the palette's space.

Of the tools you'd expect, there is a pencil for drawing waves and parts of waves; loop start and end markers; and a tool that opens the loop splice-point window. There are tools that zoom in and out incrementally or, with the Command key, all the way; loop marker selectors; axis markers; and a tool to activate the select function.

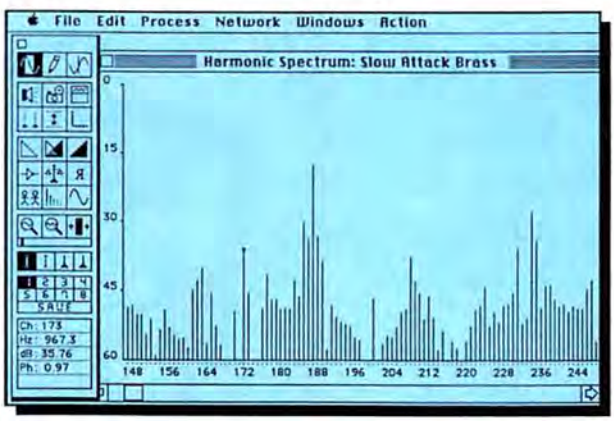
In addition, one click on the appropriate palette tool will fade all or part of a wave in or out at one of four selectable rates. The Crossfade tool automatically mixes the selected wave with the wave on the Clipboard so that one fades out as the other fades in. These functions work fast and simply to help mix two sounds smoothly into one.

The Scaling tool lets you change the overall volume of the sound just as easily by dragging a dotted line up or down. An Invert tool turns the wave upside down, for use in mirror looping, and the replicate icon fills a selected range with as many duplicates of the wave in the Clipboard as will fit. This helps lengthen single-period waves and can be used to create echos.

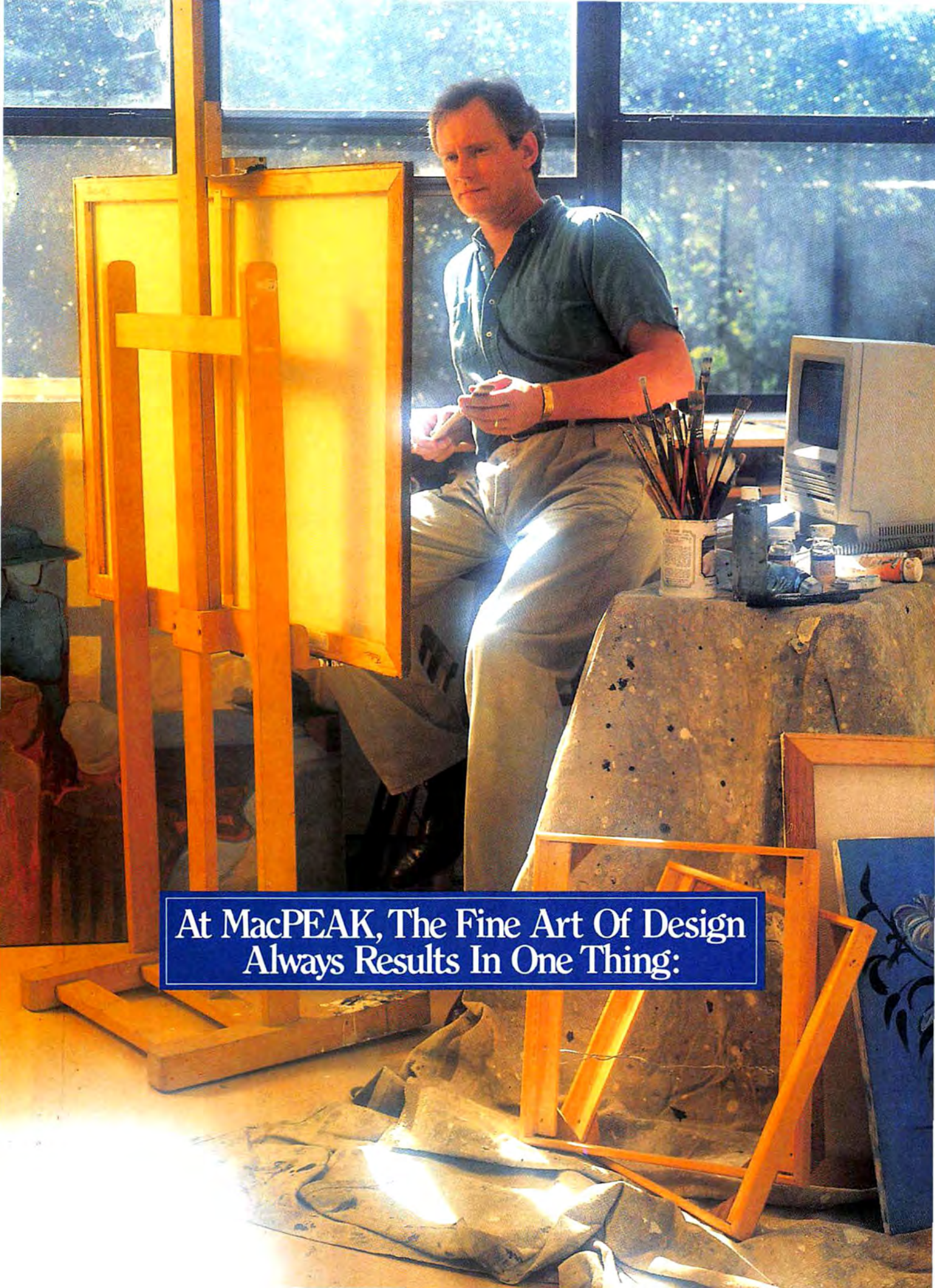
Alchemy's Fourier transform function displays the harmonic spectrum



Alchemy's main Edit screen and palette of tools pack a lot of power into even a 9-inch screen.



The Harmonic Synthesis window in Alchemy shows the frequency components of a sound (instead of the way the sound changes over time).


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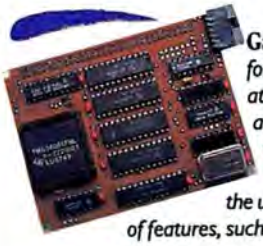
The Orion™ SE$^{20/20\text{-}25}$ Accelerator. *A full-featured multispeed accelerator card for the Macintosh SE, the Orion SE replaces the SE's standard 8 MHz 68000 microprocessor with a 68020 processor, running at either 20 or 25 MHz. The Orion SE also supports two co-processors: the 68851 Memory Management Unit, and either a 68881 or a 68882 Math Co-processor. The Math Co-processor performs math operations up to 100 times faster than a stock SE. Additionally, using the Orion SE's 8 standard SIMM sockets, users can expand to a full 8 megabytes. The result of all this power is a machine that's able to outperform a Mac II by as much as 3 times!*



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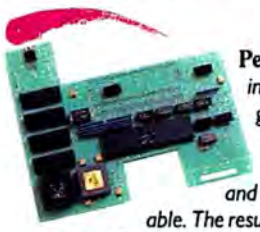
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on a bar chart, each bar representing the amplitude of a different partial (frequency component) of the sound. The amplitude of the bars can be raised or lowered by dragging, and bars can be cut, pasted, and mixed. The program then resynthesizes the waveform to reflect the changes, providing limited harmonic synthesis. Although this is not true harmonic synthesis (which includes altering partials continuously over time — this feature changes only one selected time span), this is a great way to do surgically accurate edits and has a lot of potential.

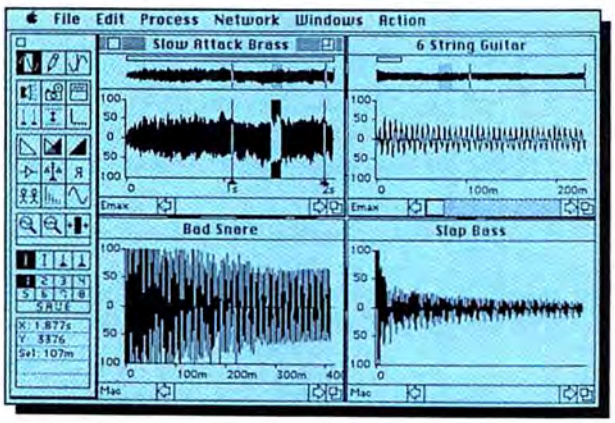
Alchemy's window arrangement is very friendly. The Strip and Tile features arrange the open windows top-to-bottom or in a checkerboard, and Overview puts a small version of the entire waveform above the active window to complement any zoomed-in view the active window displays.

Overview also displays a small rectangle that indicates the area shown in the active window and shades whatever area is selected. View Number remembers up to eight of your previous views of the wave and recalls them at a click. All of this makes it easy to move around, mitigating the limitations of the Mac's small screen.

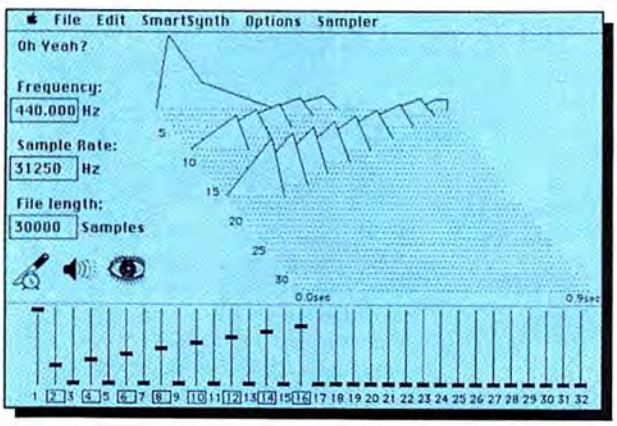
Alchemy can create stereo samples and offers sophisticated digital EQ and signal processing. The latter will resample a file to make it compatible with any sampler and can actually increase a file's sample rate through a bit of algorithmic magic. It can also create effects such as echo, flange, chorus, and reverb that have traditionally required additional hardware.

Despite a couple of minor inconsistencies, Alchemy's manual is excellent, particularly its detailed and informative introduction to sampling theory and practice. This is an intuitive, powerful, and fast-moving piece of software that adds new dimensions to sample editing.

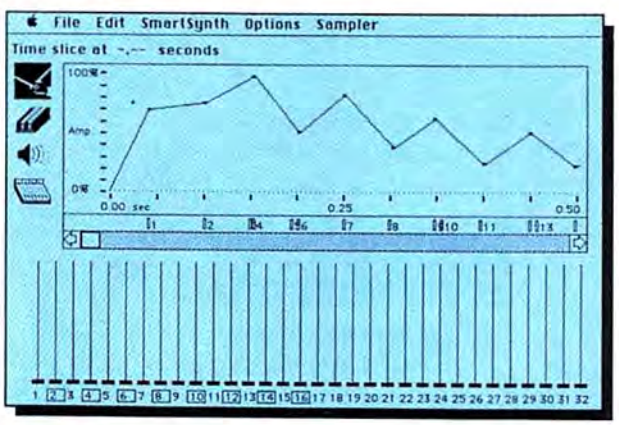
Alchemy, like the rest of these programs, really needs a hard disk. The one megabyte in my SE worked adequately, but . . . well, you know.



Tiled windows in Alchemy can mix different types of views of different sounds from different samplers. The top two include Overview subwindows. In these Overviews, the thin rectangle above the wave shows what part of the wave is blown up in the Edit window below.



The main Softsynth window shows the partial envelopes and faders for the frequencies that comprise a synthesized sound.



You can get a closer look at each Softsynth partial in the Time Slice mode.

ADDITION TRADITION

Another Digidesign program, Softsynth, covers the area left open by both Sound Designer and Alchemy. Softsynth creates sounds for samplers that use additive synthesis, the process of building up a sound by adding together a stack of partials, or harmonics.

Acoustic physics tells us that any sound can be created by stacking up a series of simple sine waves of different frequencies. Typically, the amplitude of each frequency changes as the sound sustains, each in a pattern different from the others. Softsynth's main screen makes easy graphic sense of this and shows how simple it makes the traditionally herculean job of additive synthesis. An image that looks like a Daliesque landscape represents 32 frequencies of a sound and their envelopes (how their amplitudes rise and fall over time). From back to front, each line is one frequency — its value indicated by the number at its left. Fol-

A Sampler Sampler

The first commercially available sampling instrument was introduced in 1979 by Fairlight CMI (for Computer Musical Instrument), a small company from Australia. The Fairlight had the whole shebang: a bunch of 8-bit 6800 processors; a monitor screen that accepted input from an attached lightpen; a piano-like keyboard with touch-sensitivity for putting dynamics in the music (a rare feature for electronic keyboards back then); digital synthesis of musical waveforms; a sequencer that allowed a musician to play an entire musical performance on the Fairlight, then have the internal computer play back the same performance, like a player piano; and, not least of all, the ability to record digital samples. Using its own I/O, processors, and RAM, the Fairlight could remember individual sounds of any sort — dog barks, waterfalls, or grand pianos — and store them to be played back from its keyboard as pitched notes.

NOT-SO-FREE SAMPLES

The Fairlight rapidly became the darling of the mega-studio set. The lovely clarity of its sounds and the functionality brought to production by its sequencer and processor made it the instrument of choice for those who could pay the freight. And the freight went dear; the Fairlight tipped the scales at a cruiserweight $28,000.

The next major step came in 1982, when Vermont-based New England Digital enhanced its high-ticket digital synthesizer, the Synclavier II, by giving it the ability to sample whole musical performances — not just individual samples — directly to hard disk. This system used a similar sampling process but, instead of saving a sample to RAM, it saved the sounds directly to a Winchester hard disk. The large storage available on the Winchester and the sophisticated number crunching done by the Synclavier's processor allowed it to store many minutes of sound from the Synclavier or external sources, like other electronic or acoustic instruments. (This is different from MIDI sequencing in which only MIDI data — not sound — is recorded.) New England Digital advertises its product as the "tapeless studio."

Both Fairlight and New England Digital took an integrated system approach to their products. All the sophisticated processing — not to mention memory — needed to get a worldful of sounds sampled, tailored, arranged, combined, and generally cared for is included in their machines. They do a great job, but are affordable only by the well-heeled major studio or rock star, with complete systems easily running well into six figures. Whither then, the poor potential musician/samplist in the street? Whither even the somewhat-above-average Joe with a bit of discretionary income who wants to fool around with this neat-o new technology?

THESIS

The answers to these questions began to appear in 1981 when E-mu Systems introduced the Emulator I. While not having the features of a Fairlight, the Emulator broke the sampler price barrier, retailing for around $8,000. Soon after that, The Mirage, from Ensoniq, hit the market in a stripped-down, but professionally functional $1,700 package. Each machine had a keyboard, half a megabyte or less of RAM, and only the essentials of processing, and these were communicated to the user through a two-line liquid-crystal display.

Despite their limitations, these units made sampling a financially accessible proposition for the aforementioned Joe, and the popularity of both units and their descendants was immense: the Mirage and Emulator have both sold thousands of units. Today, E-mu also makes the Emulator III and Emax samplers as well as the SP-1200 sampling drum machine; Ensoniq markets the Ensoniq Performance Sampler; and an easy dozen competitors occupy the $1,600 to $10,000 price range from companies such as Roland, Akai, Korg, Kurzweil, Casio, and Yamaha.

There are also a few samplers available that go below the $200 level, although none of the software mentioned here works with such samplers. MacRecorder, from Farallon Computing, is a hardware/software package (reviewed in the June '88 *MacUser*) with which even the most callow of us can record sounds digitally into the Macintosh and pop them straight into a HyperCard stack, use them as replacement beep sounds, or create other uses for speech, music, and sound effects.

ANTITHESIS

With the exception of the integrated systems (at the six-figure feet of which you and I can only grovel), samplers have pretty weak built-in computer power. Consequently, their ability to process the samples they take has been even more limited.

What does processing have to do with it? Plenty. Creating a musically useful sound sample is not easy. It requires a good deal more than just plugging a microphone into a sampler input, squeezing the cat until he becomes a sound source, and sitting down to record your *Garfield Sings the Most Beloved Christmas Carols* album.

Once a sample has been taken, to become useful as a musical tone it almost always needs certain modifications (at least one of which — looping — has developed a near-mystical infamy among the cognoscenti). As good as many of them are, the budget samplers all have a cramped user interface. Although most of them can do the minimum necessary sample editing, even the best communicate via a two- or three-line liquid-crystal display that barely lets the user see, let alone adjust, one parameter at a time.

SYNTHESIS

And here at last, patient Mac-reader, is where our favorite personal computer enters the fray.

While this sampling scenario was working itself out, along came the Macintosh to effect its well-known revolution in the computer/human interface. Rather quietly, without too many of the biggies catching wise, third parties began developing sample editing software that took advantage of the Mac's user interface to add the needed power to the budget samplers in a format that made even non-techies comfortable. The growth of modular sampling systems began, the Macintosh entrenched at its center.

At present, it may not be a complete stand-off, but it's not difficult to imagine a $3,000 sampler like E-mu's Emax, along with a Mac and the right software, doing the same job as one of the high-priced spreads.

low a line from left to right, and its height shows the amplitude of that frequency at a given instant, time being indicated along the left-right axis.

The lower half of the main screen looks like a set of faders on a sound-mixing board — and for good reason. Click and drag any fader, and you will raise or lower the overall amplitude of the partial it's assigned to. The program's unique power comes from the Envelope window. This screen displays the amplitude envelope of an individual partial, to which you can make up to 40 changes in its amplitude with the same click-and-drag method.

There is also a Tuning Contour window, where you can change a partial's pitch envelope as you do its amplitude. The Time Slice function allows a slightly different approach where you edit a sound's overall amplitude at a series of moments, and the Smartsynth function generates sounds according to random algorithms you can modify using self-explanatory terms like "slight," "extreme," or "bend."

Softsynth can be an important tool in conjunction with a sampler and a program like Sound Designer or Alchemy. Its only real limitations are that, despite its power and friendliness, the work of additive synthesis is still time-consuming for both human and computer. Likewise (as with all of these programs), transfer time between Mac and sampler is problematic, which brings us to Sound Accelerator.

SPEED OF SOUND

Using any of these programs, one now has the choice of either listening to one's creations through the Mac's tinny speaker at 8-bit resolution — a severely limiting factor — or moving the sound back to a sampler for playback — which takes just long enough to be annoying. I used the E-mu Emax, which helped some. Emax uses an RS-422 port to transfer data at 500,000 bits per second (bps) versus the more common MIDI rate of 31,250 bps.

Digidesign's Sound Accelerator card (which should be released by the time you read this, carrying a list price of $995) promises to tighten up this gap in the Mac/sampler system. Sound Accelerator is an add-on card for the Mac II and SE NuBus, based on the Motorola 56001 Digital Signal Processing chip. It produces CD quality (16-bit, 44.1-kilohertz sample rate) playback of samples that have been loaded into the Mac from a sampler or a CD-ROM drive. (Several prerecorded sample libraries are available on CD and CD-ROM discs.) While any of Digidesign's sample processing programs are running, the card can not only play a sample in RAM but can also play the changes in the sound as you make them on the edit screen. Both the high-quality playback and the real-time sound alteration will save time and creative energy.

To make matters even better, Digidesign and Motorola are planning to release a developer's kit, along with the Accelerator, to encourage other developers to use the card in creating their own software. If this kind of product development foresight is as successful as it should be, it will do a lot to keep the fires burning in the sample software industry.

TIM TULLY HAS BEEN DOING SOUND, SAMPLING, AND SOFTWARE FOR EVEN LONGER THAN HE HAS BEEN WRITING ABOUT IT. HE IS ALSO THE EDITOR OF ELECTRONIC MUSICIAN MAGAZINE AND IS VERY HAPPY TO LET SOMEONE ELSE DO THE EDITING FOR A CHANGE.

MACUSER RATING

Alchemy ★★★★★

Follows Mac Interface	■ ■ ■ ■ ◧
Printed Documentation	■ ■ ■ ■ ◧
On-Screen Help	None
Performance	■ ■ ■ ■ ■
Support	■ ■ ■ ■ □
Consumer Value	■ ■ ■ ■ ■

Comments: Alchemy loads and edits digitally sampled sounds from most commercial samplers, producing a sample compatible with all of them. **Best Features:** Ability to work with any sampler, excellent manual. **Worst Feature:** Requires lots of RAM to achieve best results in most applications. **List Price:** $495. Published by Blank Software, 1477 Folsom Street, San Francisco, CA 94103; (415) 863-9224. Requires 512K (two megabytes of RAM and hard disk highly recommended), MIDI or RS-422 interface, and sampler. Copy protected.

MACUSER RATING

Softsynth ★★★★½

Follows Mac Interface	■ ■ ■ ■ ■
Printed Documentation	■ ■ ■ ■ ◧
On-Screen Help	None
Performance	■ ■ ■ ■ ■
Support	■ ■ ■ ■ □
Consumer Value	■ ■ ■ ■ □

Comments: Creates sounds for additive synthesis samplers. **Best Feature:** Reduces memory requirements for additive synthesis sounds. **Worst Feature:** Downloading from Mac to sampler is time consuming. **List Price:** $295. Published by Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025; (415) 327-8811. Requires 512K, sampler, MIDI interface. Copy protected.

MACUSER RATING

Sound Designer ★★★★

Follows Mac Interface	■ ■ ■ ■ ■
Printed Documentation	■ ■ ■ ■ ■
On-Screen Help	None
Performance	■ ■ ■ ■ □
Support	■ ■ ■ ■ □
Consumer Value	■ ■ ■ ■ □

Comments: Set the standard for editing samples on lower-cost samplers. Initiated development of modular sampling system. **Best Feature:** Vastly improves on sample-editing abilities of the samplers it supports. **Worst Feature:** Lacks real-time high-fidelity playback. **List Price:** $495 (Emax, E-II, 2000/2002, DSS-1, S900); all others, $395. Published by Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025; (415) 327-8811. Requires 512K (one megabyte and hard disk highly recommended), sampler, MIDI interface. Copy protected.

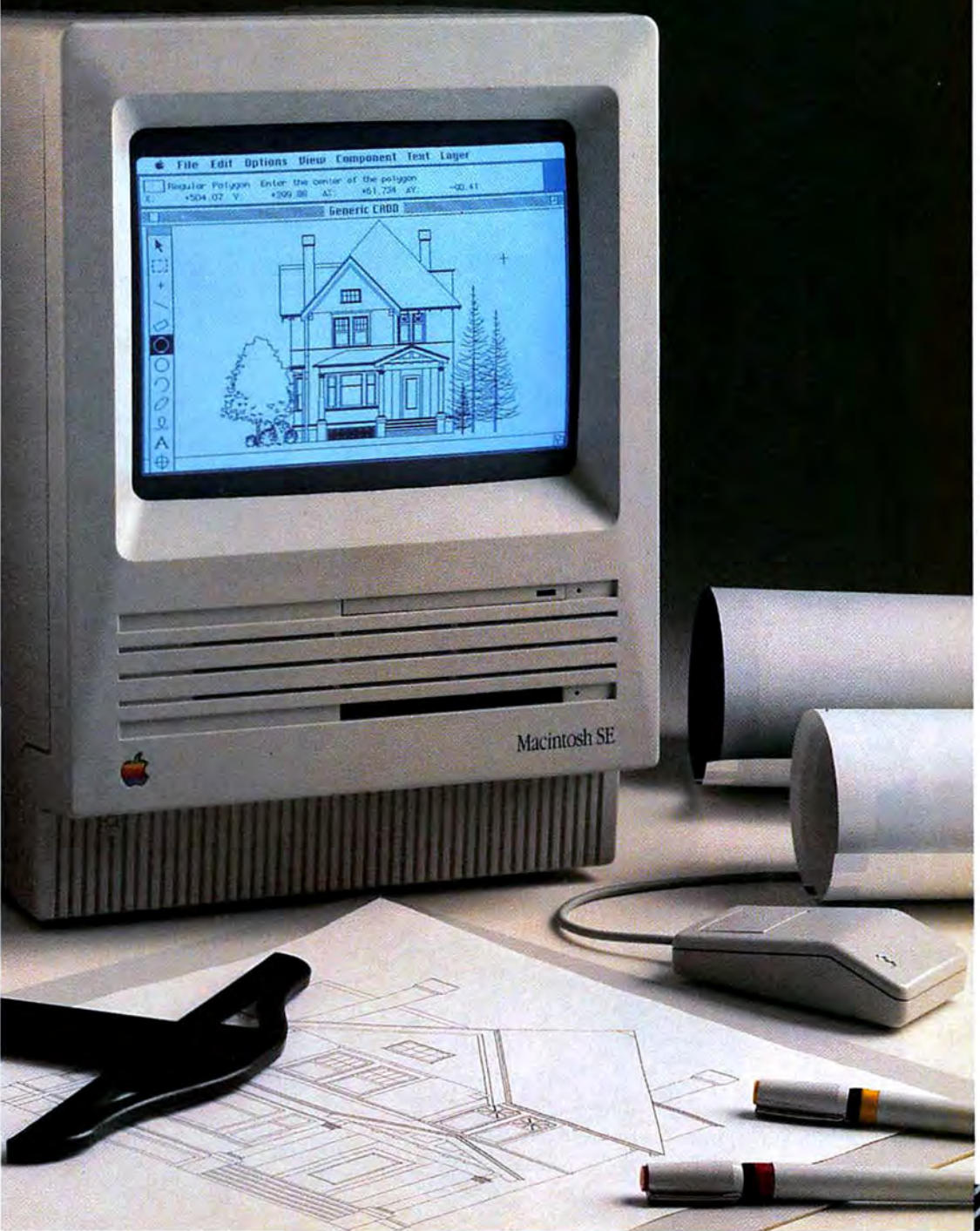
MACUSER RATING

Turbosynth ★★★★★

Follows Mac Interface	■ ■ ■ ■ ■
Printed Documentation	■ ■ ■ ■ ■
On-Screen Help	None
Performance	■ ■ ■ ■ ■
Support	■ ■ ■ ■ □
Consumer Value	■ ■ ■ ■ ◧

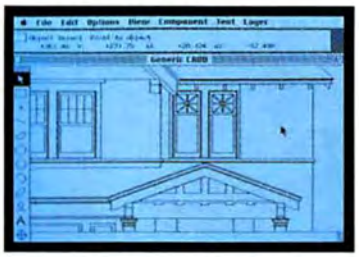
Comments: Turbosynth creates sounds for a digital sampler using modular synthesis techniques. **Best Feature:** Harmonic spectral inverter. **Worst Feature:** Lacks an easy method of multisampling. **List Price:** $349. Published by Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025; (415) 327-8811. Requires: Mac Plus, sampler, MIDI interface. Copy protected.

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SOFTWARE



The Write Staff

A new generation of desktop music publishing tools is bringing composers and arrangers new ways to score.

Music publishing is a complex and expensive proposition. Fitting the huge variety of notation symbols on a page in a form that will be easy to read and aesthetically pleasing is neither an art nor a science — it's black magic. And, using traditional techniques, you don't get many second chances to tidy things up. Even the cheapest off-shore music typesetters — engraving by hand on metal plates — charge at least $50 a page.

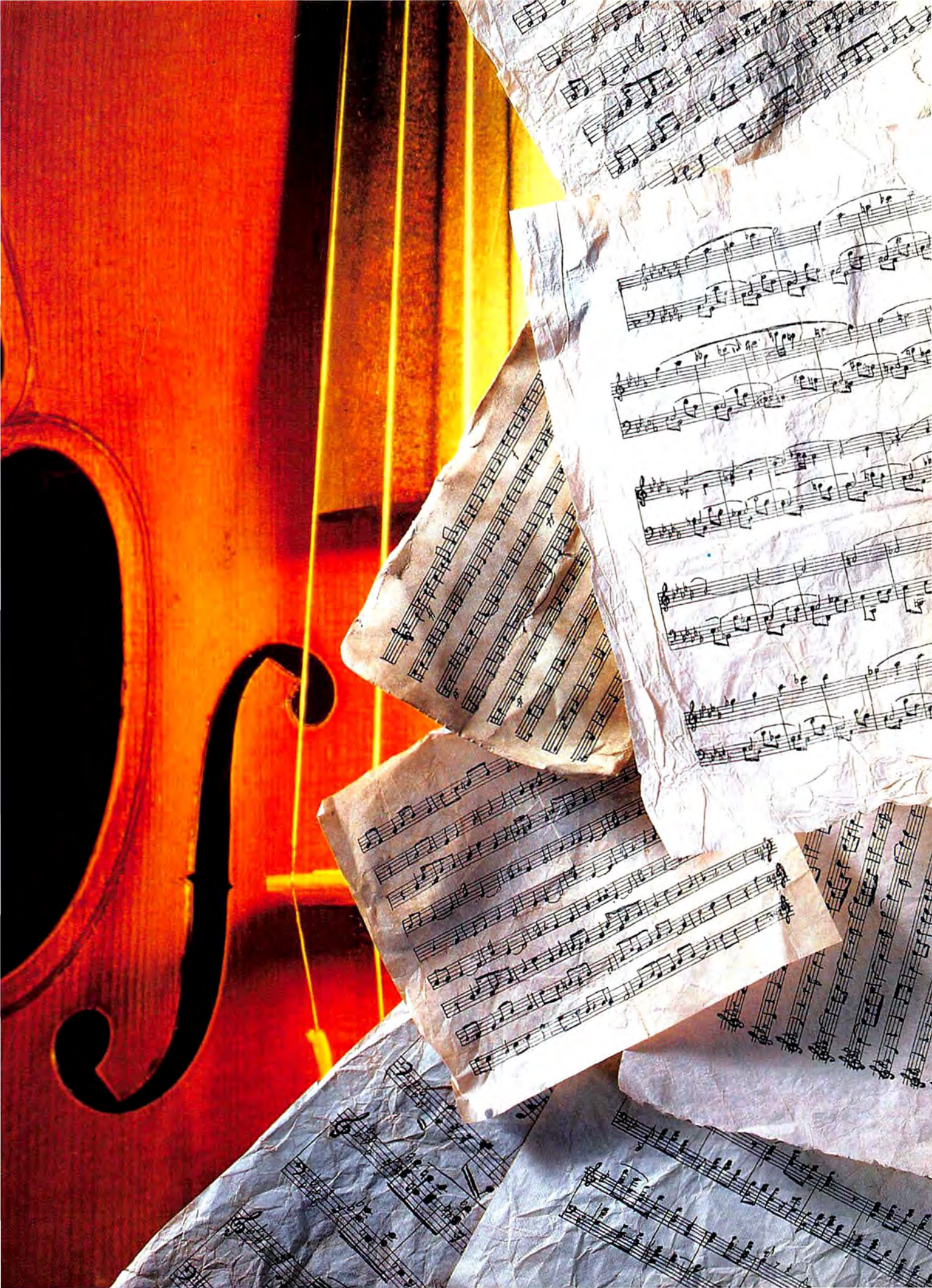
Mac-based notation programs are changing all that, making it possible to print anything easily — from a lead sheet to an orchestral score — on a laser printer or Linotronic typesetter. Some of these programs can accept direct input from a MIDI keyboard, some let you enter and edit each symbol using the Mac keyboard, and some let you do both.

But all of the early programs — like Great Wave Software's ConcertWare, Electronic Arts' Deluxe Music Construction Set, and Mark of the Unicorn's Professional Composer — had their limits ("Scroll Over Beethoven," July '88). They didn't always allow precise control over the placement of individual symbols. And it wasn't easy to export the output to a page-layout program (to include the music in a textbook, for example) or to a graphics program (to touch up the symbols). To top it off, the font many of them used — Adobe's Sonata — was incompatible with many applications.

A second generation of notation

BY PAUL LEHRMAN

GARY BUSS



programs is emerging that can do things such as generate oversized pages with scads of staves or include angled beams, expression marks, and alternative forms of notation, all of which are beyond the capabilities of the programs that made up the first generation.

> They are strictly publishing programs, with hardly any "musical" features at all.

This new generation of programs includes HB Music Engraver, from HB Imaging of Orem, Utah, and Music Publisher, developed in Australia and available from Graphic Notes of Santa Cruz, California. More programs are on the way, and I'll discuss some of them later. These programs are primarily intended for music publishers, so performers and composers may not find them very useful. Designed to allow the user to typeset music that has already been written down, they are not intended as compositional tools. Both HB Music Engraver and Music Publisher can produce professional-quality PostScript output and offer a relatively inexpensive alternative to hand-engraving for composers and small publishers.

While these programs offer many innovations that go beyond the first wave of notation software, they are not without problems. For openers, they are strictly publishing programs, with hardly any "musical" features at all, at least in their first release. Neither program has any audio output, using either the Mac's own sound drivers or MIDI. You can get a MIDI performance into Engraver, but only indirectly — by first recording it with Mark of the Unicorn's Performer sequencer, importing it into Professional Composer, and then importing that into Engraver. Both publishers say that, in subsequent releases, the programs will allow importation of the newly approved MIDI file standard (see sidebar, "Audio Files") and output of transcribed music over MIDI. In addition, Music Publisher will soon have a step-time input mode from a MIDI keyboard. Another missing feature in the first releases of both programs is the ability to extract and print parts — you have to print the full score. This, too, will likely be implemented in the near future.

Also, in their initial versions, these two programs are not in tune with traditional Mac usage. Basically, if you are willing to work in the exact manner dictated by the program's authors, and if you don't make mistakes, either one can typeset music efficiently. However, if you have your own method or you like to work quickly and fix things later (a mode of operation which the Macintosh excels at, which is one reason why it is such a great creativity tool), you're in trouble.

HUGE BENEFITS

HB Music Engraver's main screen is a large window consisting of a single

Under Construction

[In our July '88 issue, Paul Lehrman recounted the trials and tribulations of using some of the "first-generation" notation programs, like Deluxe Music Construction Set. Although these programs may not be as powerful as the latest crop of transcription tools, many casual copyists will find them more than adequate. Here's a suggestion on how to get the most out of Deluxe Music Construction Set. It came to us from a Nashville-based musician, journalist, and student named Wheat Williams III (no relation to Wil Wheaton). — Ed.]

One of the main limitations of Deluxe Music Construction Set (DMCS) version 2.0 is that it can't calculate or display page layouts. To prepare a DMCS document for paged LaserWriter output, you must perform the calculations and format the document yourself. Berkeley System Design's screen extender, Stepping Out II, can make this task easier. In Stepping Out, you create an "extended" screen big enough to display a window containing a single page of formatted musical score.

In addition, Stepping Out can display an entire "extended" screen's contents shrunk down to Mac screen size, and it permits you to zoom in and take a magnified look at any part of a DMCS score for precise symbol alignment. These abilities are invaluable in a music-editing situation, because scrolling through DMCS' window to view systems of music is prohibitively slow.

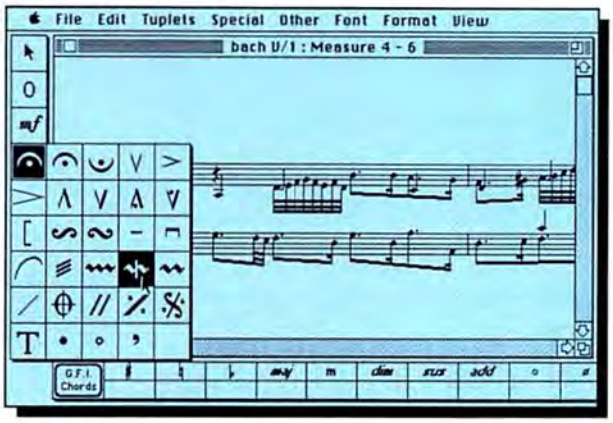
WIDTH OR WIDTHOUT

Page width, an easy item to calculate, will simply be the value you assign to the Score Width parameter in the Score Setup box. If you print out your score on the LaserWriter with no reduction, a width of 556 pixels (WYSIWYG default width) will give you output at exactly the size displayed on the screen.

DMCS works best with the LaserWriter and Laser Prep resources found in System 3.2 (which should be run with Finder 5.3) through System 4.0 (which runs with Finder 5.4), according to its publisher. Be warned, however; Apple recommends that you use the current System and drivers, and using these older Systems could result in other incompatibilities.

If you want to see more music horizontally on the screen, you need to increase the Score Width parameter. You must also decrease the "Reduce or Enlarge" feature on the LaserWriter print box by the same percentage that you increased the width. This process might take some experimentation.

Once you have formatted your first system, you can calculate the width of a Stepping Out screen. Stepping Out figures screen size in pixels, the same unit that DMCS uses to place elements in the score. All you have to do is take the page width value from above and add 17 pixels (for the main window's scroll bar) plus 48 pixels, the width of DMCS' Note Palette window (which must be visible at all times). The resulting number is the screen width of Stepping Out that you will need. If you



This is an example of HB Music Engraver's dynamics window, showing a whole system and one of the symbol palettes.

can afford the memory, increase the value by 5 or 10%, in case you need to readjust the score's width later.

WUTHERING HEIGHTS

To determine the height of your page, you will adjust the Space Above and Space Below parameters for each staff. As you do this, keep in mind how much space you'll need for lyrics between parts. To adjust for space between systems on the page, use the Space Above Staff commmand on Staff One.

DMCS automatically places 26 pixels between systems and at the tops of pages before it even considers the Space Above Staff value. Thus, if you enter a Space Above Staff of 50 (this only applies to Staff One), DMCS will actually place 76 pixels of space on the screen. Since DMCS has no command for number of systems per page, you must calculate this. To start, you need to set up a mock first page by using the Score Setup values you found earlier. To compute the height in pixels of each system in your score, add up the following: Start with 26 pixels for the extra space at the top of each system. Add 24 pixels for each staff in the system (24 is the height of each staff). Add the Space Above Staff and Space Below Staff values for each individual staff in the system.

Now, multiply the above figure by the number of systems you want on one page. This is your preliminary value for your score's page height. You should print out the first mock page before you begin entering your music, because DMCS may bomb if you make format changes while working on a document.

THE BOUNDS OF MUSIC

You will have to construct a formatted page of music that will approximate a ratio of 0.756 horizontal pixels to vertical pixels. (The print area on a sheet of paper 8 ½ by 11 inches under Laser Prep 3.1 is 7 ¾ by 10 ¼ inches.) If your music can't accommodate a 0.756 ratio and does not print out on a single LaserWriter page, try reducing the LaserWriter's "Reduce or Enlarge" value by a few points (your left and right margins on the printout will no longer be equal). Failing that, you will have to readjust all of the parameters in the Score Setup window interactively, see how the changes make the music look on the screen, recalculate the ratio, and then see if they will all fit on the LaserWriter page.

Now you can determine the height of the Stepping Out screen that will display an entire page in one window. Simply add 67 pixels (25 for the Macintosh menu bar, 25 for the window's title bar, and 17 for the horizontal scroll bar) to the value of your page height. Again, add an additional 5% if you can afford the memory.

All that is left is to launch Stepping Out and construct a screen of the appropriate width and height. And, by all means, save the sized screen in Stepping Out's "Choose Your Screen" file under the name of the composition.

— Wheat Williams III

staff with a half-dozen or so notes on it, but no clefs, key or time signatures, or dynamic markings. You select a time value for the note you want to enter with the Mac keyboard or the mouse and then click on the staff at the pitch you want. Because the screen is so huge, placement of the mouse is hardly critical, a feature which the authors claim speeds up note entry and minimizes errors. The program can support 50 musical voices on 50 musical staves — and voices can be combined on a staff or cross over from one staff to another — but the input window only shows one voice.

Other musical elements besides notes are shown on different windows, only one of which can be open at a time. There is a screen for setting up formats for pages and *systems* (staves linked together, like the left and right hands of a piano score), another for placing lyrics, another for dynamic markings, and yet another for *block text* like titles, credits, and performance instructions.

Lyrics can be tagged to particular notes in a particular voice. If you type a space while entering text in the Lyric screen, the next word you type jumps to the next note (or rest) of the associated voice. Hyphens and underline characters have the same effect. If you type a long syllable, such as the word *through*, the notes will spread out to accommodate it. When a page is reformatted and measures get moved to different systems or pages, the lyrics move along with the notes.

Dynamics — including slurs, pedalings, glissandos, trills, fermatas, custom graphic objects, and volume markings — are placed from a set of palettes on the left side of the screen. They too are tagged to the bar and beat in which they are placed. Block text is entered after specifying font, size, style, and alignment. It is locked to the entered page and does not move when a piece is reformatted.

The program follows a complicated, yet sensible and comprehensive, set of rules for setting stem directions and beaming eighth and shorter notes. For one thing, continuous beaming of voices that cross staves is allowed. The program also deals nicely with propor-


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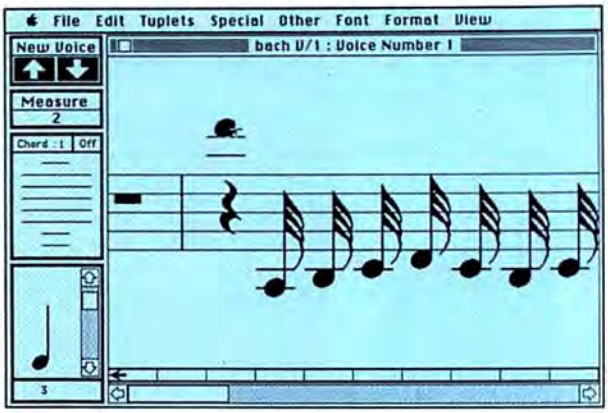
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The Write Staff



HB Music Engraver's intelligent note spacing keeps things from getting bunched up — even with drastic rhythm changes, such as in this excerpt from Fugue No. 5 of J.S. Bach's Well-Tempered Clavier, Book I.



In HB Music Engraver's Input window, only one voice can be seen at a time, with no beaming, dynamics, or lyrics.

tional spacing. Proportional spacing is the concept of how strictly the placement of notes in a measure reflects their rhythmic values. If rhythms are mirrored too strictly, thirty-second notes end up getting very crowded, and bars containing only half-notes have too much empty space. If rhythms are not followed strictly enough, the music is hard to read. Setting the rules for proportional spacing is one of the "black arts" of professional music engraving. Engraver's rules are highly refined and effective, with the result that the program can produce very professional-looking music.

But all of these rules are inviolable — if you want to do something the program doesn't like, tough luck. There is the option, however, of exporting files in Adobe Illustrator or MacPaint bit-mapped format for further tweaking. You can also export in Encapsulated PostScript format to programs like PageMaker, but you can't do any editing in that form, except for resizing and cropping.

Engraver comes with both screen and PostScript versions of its own musical font, called *Interlude*, which behaves like a character-compatible subset of Adobe's Sonata font. Although Interlude appears complete enough for most purposes, HB Imaging plans to make the font available in Fontographer-compatible form for a nominal fee. This will enable users to customize the font for their own particular notational needs.

In spite of its good points, there are two serious problems with HB Music Engraver: The user interface is very clumsy, and the program as released is buggy.

Engraver's front end doesn't really support the Mac interface. You have to open a different window each time you want to perform a new operation, and only one window can be open at a time. In some cases, what you do in one window doesn't show up in others, and in one case it only shows up in others.

Getting from one window to another can be a real pain. For example, since the Input window itself doesn't show any clefs, dynamics, beams, stem directions, or lyrics, you have to go to the Lyrics or Dynamics screens to actually see what you're entering. Once there, you can't edit notes. Likewise, the Lyrics and Dynamics screens show only one system at a time, so if you want to see a whole page, you have to go to the Block Text screen. And once you are there, you can't edit anything except block text; if you happen to notice a mistake in one of the dynamic markings, you have to close Block Text, go back to the Input window, open Dynamics, find the bar you want (the program does not consistently remember where you are as it moves from screen to screen), and edit the dynamic marking.

The note-spreading feature of the lyric entry does not actually show up on the Lyrics screen. As you enter the spaces and hyphens on that screen, you see only their effect on the music in the Dynamics or Block Text screens. If you are typing in a long line of lyrics and make a mistake in spacing, which is far too easy to do, there is no easy way to correct it. You must backspace all the way to the error and retype the whole thing. And if that weren't enough, you can't really cut and paste to move notes. When you try to do so in a voice that has lyrics attached to it, the lyrics get left behind.

Elements like time and key signatures, clefs, repeats, and double bars are placed through a complex process involving opening two different windows. Again, to see what you're doing, you have to close those windows, go back to the Input window, open another window, and then search for the right measure.

Not only is the interface awkward, sometimes it's arbitrary. On some screens, pressing the Return key is the same as clicking OK, but on others it does nothing. When painting slurs, you cannot dictate whether they bend up or down; they seem to follow some arbitrary rule that is inconsistent and undocumented.

The Page Layout window, which determines margins and placement of systems and measures, also has serious problems. The program has its own ideas about how many bars should appear in a system. It is easy for the user to work through an entire piece of 20 pages or more, carefully adjusting the measures and systems on each page, only to watch all of his work being undone by the program.

One unusual bug appears when you



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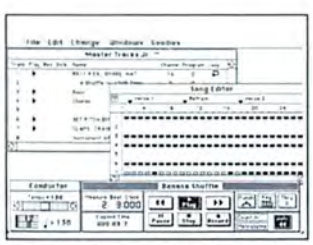
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Krafty Music Programs

What this country needs is a good $49.95 music typesetting system. That's the premise, anyway, behind ExampleKrafter, from MusiKrafters. What don't you get for that price? Well, no MIDI, for starters (never had it; never will). If you want the Mac to play your efforts back for you, this isn't the program for you. And if you want typeset-quality printed output, the cost goes up a bit. But it does have a few features that its more expensive competitors miss.

What ExampleKrafter will do is enable you to typeset from one to five staves of music. You can produce a MacPaint file for low-resolution printing, and if you spend just $139.95 more for the accompanying PrintKrafter program, you can print PostScript files of your examples on LaserWriters, Linotronics, or other PostScript-compatible printers.

If you've got PrintKrafter, you can also combine examples to create full pages of printed music. The major limitation for users who have both ExampleKrafter and PrintKrafter is that the staves can be only 6 ¾ inches wide (professional copyists often need staves as wide as 7 ½ or 8 ½ inches).



This sample of lute tablature, from LuteKrafter, typifies the versatility of the MusiKrafters family of programs.

ExampleKrafter doesn't skimp when it comes to quality. What constitutes good-looking music notation is a subjective matter, but this program gives you the tools to make your manuscript look as artful as your ability allows.

This isn't, however, the sort of program that you can just boot and run. No attempt at all has been made to follow the Macintosh interface, and the author disdains using the mouse for staff notation (too slow), though the mouse is used for placing symbols at arbitrary locations. This means that most information is entered via the keyboard. It can take a while to get the knack of the ExampleKrafter system, but it's not hard to imagine someone who finally learns all the keyboard codes entering notation at a brisk, un-mouse-impeded clip.

Because of the staff-size limitation, ExampleKrafter is not aimed at the professional music copyist (though an upgrade to allow the wider staves is planned) but at people who need to print relatively small amounts of specialized, high-quality music notation. In other words, music scholars. A typical music scholar, after all, would rather spend his or her money on a field trip to South America than on fancy music-publishing software. Special features for scholars include unmeasured or polymetrically measured music, chords of any complexity, most standard ornaments, figured bass, and musica ficta.

MusiKrafters Music Services has some other oddball music notation programs available too. LuteKrafter is designed to typeset French, Italian, Spanish, and English lute tablature, as well as certain types of cittern and guitar tablatures. Shape Notes is a modified version of ExampleKrafter that allows the user to typeset shape notes using the Aiken or Sol-fa systems (widely used in gospel music). Both programs also work with PrintKrafter to create typeset-quality printed output.

For more information on the MusiKrafters family of programs, contact them at P.O. Box 14124, Louisville, KY 40214; (502) 361-4597.

— James Bradbury

save a document in other file formats. As the screen restores itself, there's an extra ghost image, slightly offset from the original, since the other format is scaled just a little differently. Another bug: You can specify typestyles for one line of lyrics, but if you try to change any other line, for some reason the changes don't take. (But you don't know this until you have gone through three or four different windows.) The manual is also plagued with missing and incorrect information.

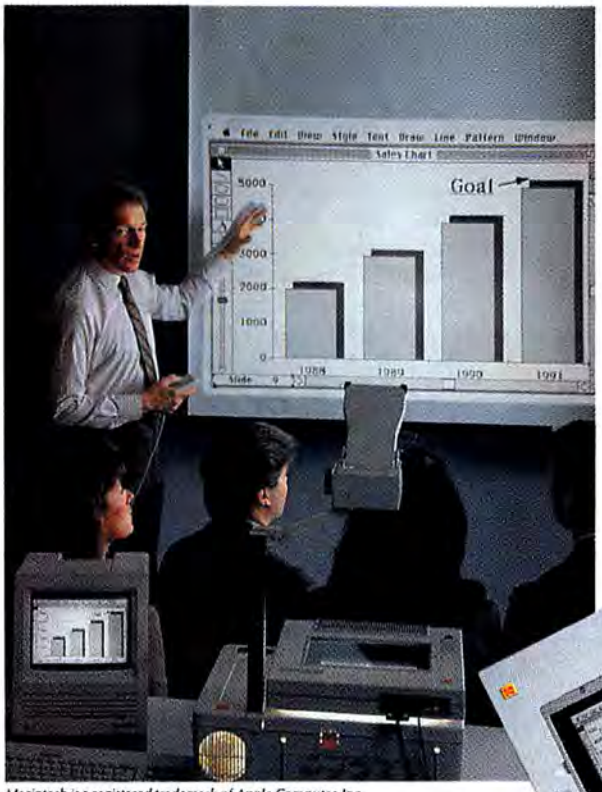
> The Presto keypad, once you get used to it, can speed up note entry considerably. One observer calls the Presto keypad the two-handed supermarket-checkout approach.

The folks at HB Imaging swear that they are taking care of these problems. The bugs will be fixed, the manual will be totally rewritten, and the input window will be expanded to show multiple voices. The clumsiness of the user interface, however, seems to be burned in at the very deepest level, and it may take more than one revision.

LOOKING SHARP

Graphic Notes' Music Publisher takes a rather different approach to music notation. The authors, deciding that the traditional keyboard/mouse method is too slow for music notation, have included in the package a special 36-key pad known as *Presto,* which ties into the Mac's ADB keyboard bus. Various cables are provided so that it can be used with any Mac. The Presto pad handles the task traditionally giv-

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The Write Staff

en to the mouse — placing notes and other characters on the staff.

Rhythmic values, as usual, are handled by the Macintosh keyboard, but the keyboard does far more than that. Various Shift-key and Option-key combinations let you place many other symbols — including clefs, accents, grace notes, trills, and time signatures, as well as both pitched and unpitched noteheads. Because of this complexity, Graphic Notes includes a sheet of transparent *Keycap Stickers* for the Mac keyboard, to show the various characters.

Thankfully, Music Publisher has only one display screen, with everything on it. The various tools for dealing with notes, bar lines, dynamics, and so on, are accessed separately from a movable palette. There are several magnification screens available, but you can't actually work in any of them. If you click on any of them, the display jumps back to 100%.

Music Publisher includes such powerful layout tools as selectable line thicknesses for graphics, selectable fonts for dynamic markings, single-point spacing and manual or automatic leading for text, and tabs and ruler guides. You can even set systems on a page with custom configurations, which can be saved and recalled at any time. Having so many characters available directly from the main keyboard and from the Presto keypad — once you get used to it — can really speed up note entry. (One observer calls it the two-handed supermarket-checkout approach.) The keycap stickers are really a necessity if you want to take advantage of this feature, and if you object in principle to sticking things onto your keyboard (as I do), you have a dilemma. If you're really serious about this program, however, investing an extra $100 or so in a (used) extra keyboard is not out of the question. Like HB Music Engraver, Music Publisher has its own font, called *Repertoire*. In this case, however, you must use the program with the provided font; it will not work with Sonata. And Music Publisher does not export graphics in any form.



Music Publisher's main screen contains all the musical elements and one palette for changing tools. You can also display the screen in different magnifications, but you can't edit anything except at 100 percent.



Music Publisher uses a combination of its custom keypad and the Mac's keyboard for entering a score. The interface takes some getting used to, but for publishers it can be a real timesaver.



Music Publisher's unchangeable rhythm-based spacing can produce music that looks alternately too crowded and too sparse.

FALLING FLAT

Like HB Music Engraver, Music Publisher is showing its youth — it has many problems. Chief among them is that it is locked into time-proportional spacing: a sixteenth note always takes up one-fourth as much physical space as a quarter note, no matter how many of each are in a measure. You can stretch and compress bars, but you can't move individual elements within a bar, except by using an exceptionally tedious Option-cursor method that lets

PETER A. GOULD

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you move only one element at a time. As a result, rhythmically complex music can look very stilted.

If HB Music Engraver's user interface is clumsy, Music Publisher's is downright unfriendly. If generating scores is your main business — if you're a copyist, arranger, or music publisher — you'll get used to the interface soon enough. (In fact, the program was originally developed by a music publishing house to automate its in-house engraving operation.) But if scoring is just a necessary evil you have to squeeze in with composing or performing, you might get irked at some of the nonstandard aspects of the interface.

Music Publisher doesn't work quite like your sequencer, patch editors and librarians, or word processor. There are lots of little tricks in selecting notes and other objects for editing — involving Option-clicks, triple-clicks, and Option-cursors, to name a few — that are not at all intuitive and are sometimes inconsistent.

For example, if you want to change the pitch of a note, you click on it and type in the new pitch from the Presto keypad. To go to the next note, you use the left or right cursor key. However, if you want to change the horizontal placement of a note, you have to Option-click on it and then use the left or right cursor key while holding down the Option key. But if you click on a note and then use an arrow key to move to the next note in a voice, you can change the placement of this note without Option-clicking. Did you get all of that?

There is also no linkage between text and notes, which means you're on your own about making sure there is enough room for both. Making room for text after you've placed the notes can be a major task. Should you discover during this process (or at any other time) that the music on a system is too crowded and you would like to move a bar down to the next system, you can't do it without a tremendous amount of trouble. You have to create a new bar at the end of the piece, cut the rest of the piece (one voice at a time), and paste it in one bar later. Next, cut the bar in question (also one voice at a time) and paste it in on the new line, eliminate the now-empty bar, and re-space the remaining bars and the lyrics. Now, of course, you run the risk of the next line being too crowded.

If you create your own custom system for a particular type of score, you have to remember to specify how barlines will carry over between staves (whether they will be broken or connected). If you don't, the program does not give you a default arrangement for barlines; instead, you get no barlines at all. If you try to place barlines later on in the editing process, you get a very confusing error dialogue. This rule is so strict that you must specify barline connections even in a custom system that has only one staff, which is silly.

Graphic Notes promises that many of the problems in this initial release will be cleaned up, perhaps by the time you read this. And the programmers are working on note-lyric linking and a nonproportional spacing option.

SPECIFIC OVERTURES

HB Music Engraver and Music Publisher are just the beginning of the new wave in notation; there's a veritable explosion of music-notation program development going on. It would be a bit much to expect that the market will support all of the new programs, but that's not stopping anyone yet. The most talked-about of the bunch is Fi-

Audio Files

When you need to move information from one electronic music device (such as a synthesizer, sampler, or computer) to another, the five-year-old MIDI interface dictates a standard format for making sure your data can get around. But it doesn't say anything about how to *store* that data in a universal standard file format that any software package that speaks MIDI can open. Fortunately, there's now a MIDI file specification that promises to bring some uniformity to stored MIDI data.

MIDI files bring to MIDI data, such as sequences of notes and rhythms, the basic data changeability that the Macintosh pioneered with text and pictures. Since the Mac's clipboard has uniform ways of storing text and pictures, it lets applications share data back and forth without knowing anything about each other.

Before MIDI, each hardware manufacturer had his own proprietary interface. There was Oberheim's System, Roland's Digital Communication Bus, and Sequential's digital interface. When MIDI came along, everyone agreed on how instruments and sequencers, regardless of manufacturer, would talk to one another. MIDI files are to sequencers what MIDI was in getting instruments to communicate with each other.

There are several MIDI sequencer programs that already implement the MIDI file standard. They include Passport Designs' Master Tracks Pro, OpCode's sequencer, all of Intelligent Music's products (Jam Factory, M, and UpBeat), and Southworth's MidiPaint. Hybrid Arts and Dr. T's Music Software are interested in implementing MIDI files in their upcoming Atari ST software.

Eventually, MIDI file data will be accessible via the Clipboard in the same ways that text and graphics data are now. At this point, however, MIDI files are dealt with only on a Save As MIDI File basis — you have to select Save, Export, and Open instead of Cut, Copy, and Paste.

Like standardized text, spreadsheet, or graphics formats, the goal is to be able to share files with musicians using different applications or even different computers. You might record a sequence on a Mac and hand the file to someone using a PC to transcribe it using a scoring or notation program. However, MIDI files, like a Save As Text Only command in a word processor, wipe out some of the control data used in MIDI sequences. In other words, you can still lose something in the translation.

The MIDI file spec was conceived and largely authored by Dave Oppenheim, of OpCode Systems. Dave realized that a standard file format would let people write little programs to manipulate MIDI data in ways that would interact with various MIDI sequencers. He hoped that such a format would prevent users from having to write their own sequencer programs. MIDI files were born when he was attempting to document a file format for OpCode's sequencer. Realizing that OpCode's file format was a bit too complicated and that there were, as he puts it, "things that were either

nale from Coda Music Software, but I'll get to that later. For now, here's some information on other forthcoming and notable programs we can talk about (there are others that are in even earlier stages of development, on which mum's the word).

Advanced Music Notation Systems, of Maynard, Massachusetts, is working on Nightingale, a MIDI program with full real-time input and output capabilities that uses a notation front end. (The name is a pun on *Mockingbird*, a music-notation project at the Xerox PARC in the early 1980s.)

Every note in a Nightingale file has two distinct identities: one graphic and one MIDI. A note can appear on a staff as a quarter-note but actually last only a third of a beat. The two aspects of a note can be edited separately or together. This is an important feature for composers who want to print out their MIDI recordings without changing those performances to conform to standard music notation by quantizing attacks and durations.

Dynamic markings can also be recognized as MIDI data. Besides conventional notation, Nightingale can display MIDI data using a clever form of *piano-roll* notation that combines standard staves and markings with the length-equals-duration graphics used by many sequencing programs.

Nightingale uses Sonata font and allows great control over placement and slope of slurs and beams. The authors' objective is to make the "easiest-to-use serious notation program," with an intuitive user interface. The price is expected to be between $400 and $500, and the authors hope to have it out around the beginning of 1989. At press time, final negotiations on distribution were underway.

Passport Designs recently announced two programs. NoteWriter, which should be shipping by the time you read this, is a graphics-based program with no MIDI features. Developed at the University of British Columbia, NoteWriter is designed to emulate a traditional music engraver's drawing table. In addition to the usual tool palette, one- or two-letter mnemonics can be typed in from the Macintosh keyboard to call up musical characters, which can then be placed with the mouse. In one mode, called *QuickScrawl*, short freehand movements of the mouse that approximate the drawing of a note on paper are interpreted as specific Sonata characters. This seems a little strange at first, but once you get the hang of it, it can make data entry go quickly.

Another interesting feature of NoteWriter is an alignment tool, which simulates a drafter's rule and allows quick, precise placement of characters. The program also has a removable invisible grid. Interactive page-showing and scrolling modes have been implemented to simplify and speed up layout. Page sizes up to 48 inches are supported, with up to 40 staves per page. The program can output directly to a PostScript printer or store files in Encapsulated PostScript format. The planned price is $295.

Encore, which is scheduled for release around the end of the year, is a transcribing program designed for the MIDI musician who needs printouts of scores and parts. Encore works with MIDI files or files from Passport's Master Tracks Pro sequencer. Editing can be done simultaneously on displayed notation and MIDI data. The program plays in real time over MIDI and accepts step-time input from a MIDI keyboard. The projected price is $395.

too proprietary or even too embarrassing to explain," Dave decided to make a simpler file format to simplify OpCode's own format. In the end, he created a format simple enough to become a generic standard.

Like any attempt at an industry standard, MIDI files have not been without criticism. Some of the format's obvious disadvantages are that there are always going to be variations between MIDI sequencers. For example, Southworth's MidiPaint is a graphics-based, almost MacPaint-like sequencing program. With MidiPaint, note events are displayed in a highly visual fashion. At the other end of the spectrum is Mark of the Unicorn's Performer, which is based on the concepts used in the operation of a tape recorder. Here, notes are displayed in MIDI event lists. Standardized MIDI files attempt to fill the gap between such radically different program architectures, but there's a lot of ground to cover.

A MIDI file converter is also not an easy piece of software to write. Programmers who write computer-based sequencers will probably take the time to include them. But those who build dedicated hardware sequencers (as standalone units or built into keyboard instruments and drum machines) are probably going to shy away from MIDI files, at least initially.

There are other payoffs (besides data compatibility) that make it worth the trouble. MIDI files can make it easier for a third-party to enhance an existing piece of software — to add one or two features to a sequencer, for example, without having to start from scratch. A sequencer's MIDI file could be downloaded into a little homemade module that might adjust the feel of the sequence, and could then be sent back to the main sequencer for further manipulation.

The MIDI Manufacturer's Association (MMA), which approves MIDI standards for the U.S. and Europe, has just ratified Dave Oppenheim's MIDI Files Specification 1.0, and the Japan MIDI Standards Committee (JMSC) is expected to follow suit in the near future. MIDI files are now an integral part of MIDI, and the specification will be published as an addendum to the MIDI spec.

The approved MIDI file spec doesn't include provisions for the transmission of MIDI files. Of course, files can be transferred from one computer to another over modems or via direct serial connections, but this is much slower than a MIDI-specific transmission scheme. MMA is reportedly working on a generic file transmission protocol for MIDI.

Currently, MIDI files can be transferred from one sequencer to another sequencer on the same make of computer; there's no all-purpose file copy capability. If you're going from a hardware-based sequencer into a computer, though, there's no way of doing it without recording data in real-time — playing the data off one machine and recording onto another. (Just like you did with tape — remember tape?)

— David Leytze

Electronic Arts is planning a new release of Deluxe Music Construction Set, to be known as version 2.5. The program's author says that the new version is basically a "clean-up" of version 2, but it will also include such important features as text alignment, ties that can go either up or down, improved MIDI implementation, and something that will really bring it into the big leagues: 32 staves per score, up from eight. Due out by the time you read this, DMCS 2.5 will sell for about $130.

THE GRAND FINALE

And finally, there's Finale, from Coda Music Software. No music program in history has garnered such curiosity, enthusiasm, anxiety, and hype. At $1,000, it aims to be the be-all and end-all of music processors. Originally announced for a June release, the program was delayed a couple of months for final tweaking but should be out by the time this article hits the stands.

Although it has features far too numerous to go into here (its documentation will consist of three bound volumes and a videotape), most of the excitement about the program focuses on its ability to interpret music performed on a MIDI keyboard and display it immediately in perfectly readable standard notation.

The key phrase here is "perfectly readable." Under the best of circumstances, music notation can be only an approximation of a real performance — if a program tries to distinguish between notes that are 63/64ths of a beat and ones that are exactly one beat, things can get messy real fast. Most music notation programs use some kind of after-the-fact quantization algorithms to regularize the music before it's displayed, and then they let you tweak the results for clarity and accuracy. Finale does it on the fly, in essence making extremely fast decisions about what it thinks you wanted to play, not what you actually played. It's a feat comparable to reverse-engineering an Edsel and turning it into a Rolls-Royce — while it's going past you at 90 miles per hour.

After the performance is recorded (although the music notation may look clean, the grimy details of the performance can remain in the computer untouched), you can reconfigure barlines and beats on the screen or in real time, without moving the notes, so the rhythmic structure of the printed music can be altered. You can create your own dynamic symbols (in PostScript) or text commands and then tie them to specific types of MIDI events, so that you can literally operate MIDI controllers by moving graphics objects around. Or you can type in "take it easy" and have the music slow down by a predetermined amount. One thing Finale doesn't offer is numeric MIDI editing, now used in most sequencers, with which you can microscopically adjust note velocities, timings, and controller values. But early users of Finale say its symbol-creating and editing capabilities are so useful that you don't really need to get to the numbers.

If Finale turns out to be the program many hope it is, it will not be an unreasonable investment for the musician who has already sunk a great deal of money into instruments, computers, and printers. What promises to be steeper than the price, however, is the learning curve. One pre-release user of the program has said that it would take even an experienced computer musician two solid months of work to get comfortable with it. Not many musicians can easily afford to take that kind of time.

ENGRAVABLE YOU

These second-generation programs are aiming at a variety of audiences: professional publishers, who stand to save tons of money by substituting a computer for hand-engraving; professional and semi-professional musicians, who need to generate scores and parts for publishing themselves, for copyright purposes, and for use in performance; and music educators, who need to create textbook examples and lessons. Whichever category you fall into, you'll find features in these programs that are designed to speed up your notation chores and make your life easier.

But some labor-saving devices are so temperamental, idiosyncratic, or limited that *you* end up working for *them*, instead of vice-versa, regardless of how impressive they initially appear. (Remember the 128K Mac?) By this time next year, when more of the players have come out of the vapor and others have gone through a couple of revisions, the state of the art will be impressive, indeed.

PAUL D. LEHRMAN, A MACUSER CONTRIBUTING EDITOR, LEARNED HOW TO READ MUSIC WHEN HE WAS SIX BUT NEVER DEVELOPED A LEGIBLE HANDWRITING STYLE, SO HE IS HAPPY ALL THIS IS GOING ON. NEVERTHELESS, AS HE CONTINUES TO WRITE FILM SCORES IN HIS HOME MIDI STUDIO, HE SUSPECTS IT IS ALL UNNECESSARY.

Directory

Advanced Music Notation Systems
23 South Stanworth Drive
Princeton, NJ 08544
Nightingale; $400 (approx.)

Coda Music Software
1401 East 79th Street
Bloomington, MN 55425-1126
(612) 854-1288
Finale; $1,000

Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
(415) 571-7171
Deluxe Music Construction Set;
$129.95 (version 2.5)

Graphic Notes
200 Seventh Avenue, Suite 125
Santa Cruz, CA 95062
(408) 476-0147
Music Publisher; $595

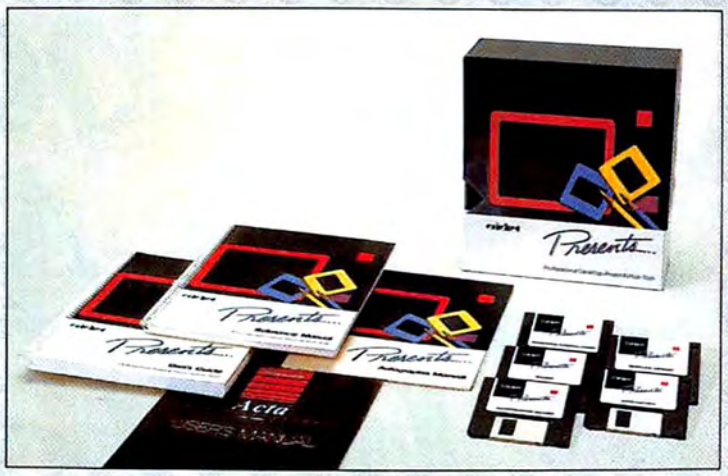
HB Imaging
560 South State, Suite G1
Orem, UT 84058
(801) 225-7222
HB Music Engraver; $495 (version 1.1)

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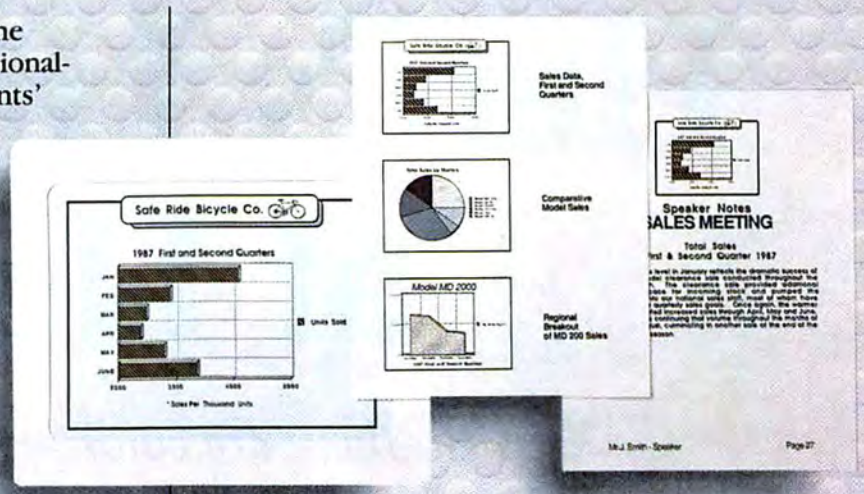
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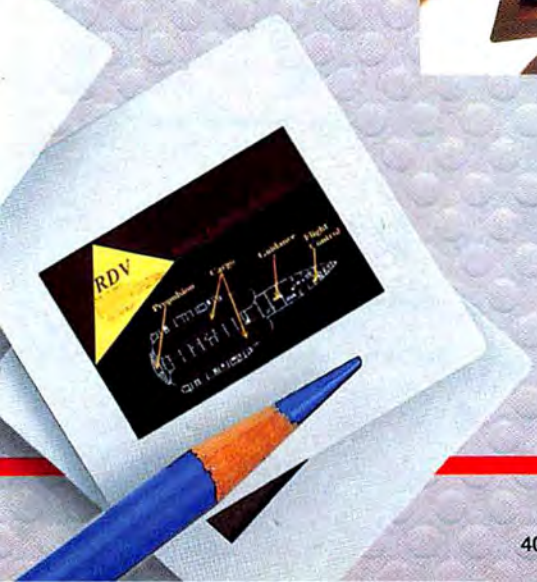


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Here's Looking at Hue

At last, there are color printers for the Mac. MacUser looks at the Tektronix 4693D and the QMS ColorScript 100.



TEKTRONIX 4693D

Imaging technique
Bit map, ordered dither

Processor
68020 (16.7 MHz)

RAM
4 Mb standard, optional 8 or 12

Interface(s)
8-bit parallel (1 or 4 ports)

Networkable
No, but up to four computers can be connected to separate ports

Paper sizes
Letter, legal, A4

Sheet capacity
100

Resident fonts
N/A

Physical size (with paper tray)
21.2 x 33.8 x 12.6 inches

Weight
97 lb.

Required Mac configuration
Mac II, 1 Mb RAM, color monitor required to print color images

Recommended Mac configuration
2 Mb RAM or more

Recommended printer configuration
8 Mb RAM

BY HENRY BORTMAN

QMS COLORSCRIPT 100

Imaging technique
PostScript, halftoning

Processor
68020 (16.7 MHz)

RAM
8 Mb

Interface(s)
AppleTalk, parallel, RS-232

Networkable
Yes (AppleTalk interface only)

Paper sizes
Letter (A), tabloid (B), A3, A4

Sheet capacity
150

Resident fonts
35

Physical size (with paper tray)
20.9 x 22.2 x 24 inches

Weight
112.5 lb. (printer plus controller)

Required Mac configuration
Any Mac

Recommended Mac configuration
Mac II, 2 Mb RAM

Recommended printer configuration
No options



PHOTOS: PETER A. GOULD

Have you noticed that once you get those beautiful color images up on your Mac II screen, it's hard to figure out what to *do* with them? If you can't *show* them to someone, what good are they? And if the only way you can show them to someone is to run down the hall yelling, "Hey, come look at this," it wears a little thin after a while. Like, where are the *output* devices?

We knew you'd be asking these very questions. We've been asking them ourselves. So, 'round about May of this year, we got hold of two 300-dpi color printers, a Tektronix 4693D and a QMS ColorScript 100, and gave them a workout. The results were, as Mr. Spock would say, fascinating.

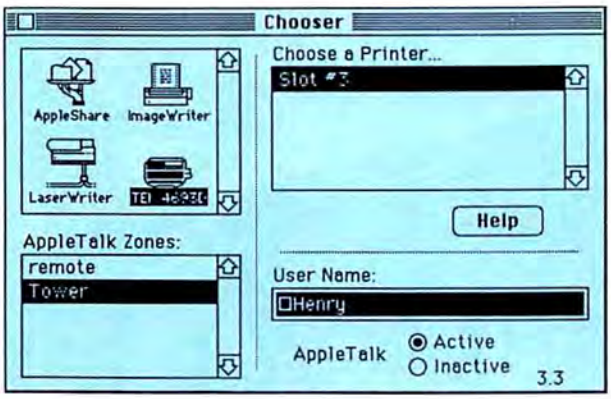
A few things are worth keeping in mind. First, low-end color printing technology is in its infancy. Of course, in the world of silicon, technology tends to age rapidly. But still, it's only fair to remind ourselves that this is *new stuff.*

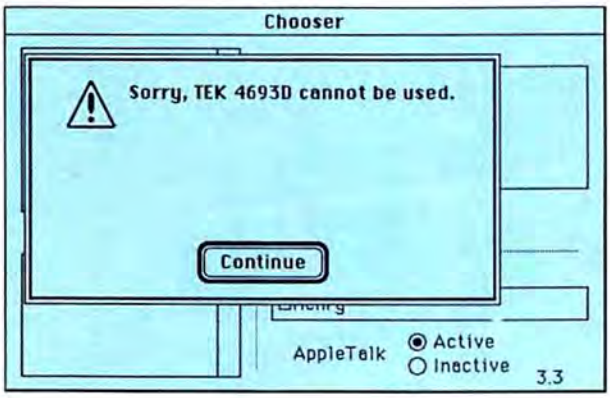
Second, both printers have an output resolution of 300 dpi, like the majority of black-and-white laser printers. You can expect to get some fairly good-looking output, but it's simply not going to compare to the pictures in *National Geographic.* It can't.

Furthermore, the colors that emerge from these printers — at least at this point in their evolution — will not precisely match either the colors you see on your screen or the colors that result if you print four-color separations of your images on a commercial offset press. Some colors will be close; others will miss by a mile.

Third, although these two printers use nearly identical printing technology (wax thermal transfer), they are very different in other respects. The Tektronix 4693D is a bit-map printer, more or less a functional equivalent of the LaserWriter II SC but with color. The ColorScript is a PostScript printer, more akin to the LaserWriter II

Here's Looking at Hue





The 4693D comes with a custom printer driver which you copy into your System folder. It then appears in the Chooser, where it can be easily selected most of the time. Occasionally, under MultiFinder (System 6.0), the Tek printer becomes unchoosable and you must quit all open applications before you can access it.

NT. Many of the differences between bit-map and PostScript black-and-white printers apply here as well.

What follows is a general discussion of each printer's features. Several of the critical factors distinguishing their performance are covered in sidebars. For example, almost all the applications we tested worked with the 4693D, but, to our surprise, only a few could print color to the ColorScript 100. "Whaddaya Mean It Doesn't Work?" gives the details. "What You Get Is What You Get" addresses how well the colors output by each printer match the colors you expected (you may need to learn to adjust your expectations). And "What's in a Face" talks about the problems inherent in printing type with bit-map printers and explains why the ColorScript's type looks so much better than that of the 4693D.

THE TEKTRONIX 4693D

The 4693D (about $10,000 for the minimum configuration) is not a networkable printer, and the only Mac that supports it is the Macintosh II. To use the printer, you must install a NuBus card in one of your Mac II's slots. Although the printer cannot be networked, Tektronix does offer a four-port option (one port is standard) that allows several computers—Macs and PCs and Suns, even some mainframes, are all supported to one degree or another—to be connected at once, each with its own separate cable.

Installation of the card and cable is simple, and the manual guides you through the process with clear instructions. The procedure includes setting some parameters by using the programming buttons and the liquid-crystal display (LCD) on the printer's front panel. A little unfamiliar, perhaps, but not hard if you follow directions.

You must also install the four-color ribbon. To call it a ribbon is a bit of a misnomer in our opinion. It's more like a roll of colored cellophane wrap, only it's sturdier and doesn't cling together. It's not hard to install, but it doesn't just pop in like a toner cartridge, either. Don't answer the phone in the middle of the operation.

Special paper must be used for successful printing. The Tektronix supports both letter- and legal-size pages, and the company sells paper in both sizes. The 4693D can also make transparencies. Special transparency film is available from Tektronix. Regular transparency paper, the kind used in copy machines, will also work.

The 4693D has its own printer driver, which you must copy from one of the supplied disks into your System folder. Doing this adds a 4693D icon to the display in your Chooser. When you want to print to the 4693D, you select its Chooser icon first. Most of the time this works without any problem. On occasion, however, when running under MultiFinder, the 4693D driver becomes inaccessible from an application. As a result, you have to quit all open applications before you can choose it.

After you choose the 4693D driver, Page Setup and Print will invoke unfamiliar dialog boxes. The Page Setup dialog box offers a number of options that affect the printer's output. You have a choice between low (75-dpi), medium (150-dpi), and high (300-dpi) resolution. Images print significantly faster at lower resolutions. At high resolution, images from object-based drawing programs, like FreeHand or Illustrator 88, will print with greater precision.

In Expert mode, two other sets of controls are available that directly affect the appearance of colors printed by the 4693D. The manual states that when you select Gamma Correction, "the printer attempts to correct colors for printing inaccuracies"; and that with Color Matching, "the printer attempts to match the colors as they appear on the screen." However, while each of these does modify overall color appearance, neither one performs a major overhaul that brings the printed colors qualitatively closer to what is displayed on the screen. A set of adjustments that let the user lighten all the printed colors to varying degrees also has a noticeable effect but, again, does not bring printed colors into correspondence with displayed colors. Fi-

What You Get . . .

One of the first comments most people make after comparing the output of either the 4693D or the ColorScript 100 with the colors displayed on a Mac II screen is "Oh, they don't really look the same, do they?"

No. They don't. Display technology and print technology are very different. A display is a source of radiated light; a printed page reflects light from an external source.

This is one of the reasons why color systems that can be relied on for exact color matching cost hundreds of thousands of dollars. Furthermore, the colors that you see on your Mac II screen can vary widely from one monitor to another, even among monitors of the same model. Or try this: get a color image up on your monitor. Adjust the brightness and contrast controls. Which colors are the "real" ones?

It's perfectly understandable that Mac II users who create artwork or presentations on their computers want the output they generate from a color printer to match what they created on the screen as closely as possible. But one of the first things you'll discover with either of these printers is the art of compromise.

For most applications — producing a set of color overhead transparencies for a presentation, a color page for inclusion in a handout to a small group of people, or a low-cost color image for inclusion in a wall display — getting an exact match between screen colors and printed colors won't usually be that important. By trial and error, you'll learn what colors to select on-screen to generate acceptable colors on your printout.

However, many people will also want to use these printers to make low-cost prepress proofs. For this purpose, color matching is more critical.

What is at issue here is not how well the color printers reproduce what you see on your *screen.* Far more important is how closely the colors in the output from your color printer — your proofing device — match the colors you see when you print your final art on an *offset press.*

While the 4693D and the ColorScript 100 use similar four-color wax-transfer technology, the computer processing that precedes the actual transfer of colored wax to paper is very different for the two printers. Outputting the same artwork to both printers produces dissimilar results. These differences affect how well-suited each printer is to various uses.

Many color Macintosh applications, such as FreeHand, which we used to produce the color block tests on the following pages, allow users to specify millions of different colors in their artwork by assigning various percentages of cyan, yellow, magenta, and black (CYMK) to objects in their artwork. These are the four ink colors used in process color offset printing and the four wax colors used in wax-thermal printing.

This CYMK information, however, can be utilized fully only when the artwork is actually printed. When it is displayed on the screen, because of the current limitations of the Macintosh, only 256 different solid colors can be shown. FreeHand doesn't allow the user to determine which 256 colors will be displayed. It always uses the standard Apple System color palette, a preset group of colors. When you specify a CYMK color in FreeHand, the application will display whatever it considers to be the closest match from the System palette. So two colors specified differently can display as the same color on the Mac II's screen. (If you blend between two colors in FreeHand, the program will use dithering to simulate the blend, which, in effect, expands the range of colors that can be displayed.)

The 4693D, as we have said, is a bitmap printer. When you print to it, it takes the RGB values of each pixel on the Mac II's screen and processes them through an ordered dither matrix to determine what CYMK wax colors to put on the page.

The ColorScript 100 gets its color information not from the pixels displayed on the Mac screen but from the CYMK color information specified by the user. It then processes that information through the PostScript halftoning algorithm.

What does all this mean? First, there's the issue of where each printer gets its color information. Although each color in the test squares is specced differently, several adjacent pairs of squares in the 4693D output look identical. That's because the 4693D gets its color information from the Mac's *display.* Colors that display identically on-screen print identically on the 4693D. The 4693D is capable of printing the same 16.7 million different colors that the Mac is capable of displaying.

Nevertheless, until both Macintosh System software and applications change, Tektronix output from most applications will be restricted to the 256 colors in Apple's standard System palette. (Dithered blends are an exception in output, as they are in the display.)

By contrast, the ColorScript 100, which can interpret directly the user-input CYMK color specifications, can distinguish each of the individual colors in the test pattern. For this reason, the ColorScript is likely to be a better choice for producing press proofs.

But remember that thermal wax and printer's ink have very different characteristics. Furthermore, the ColorScript, being a 300-dpi PostScript printer, can produce the equivalent of about a 55-line halftone screen. High-quality offset printing is usually done with 133- or 150-line screens. It should come as no surprise, then, that the ColorScript can't precisely match all the colors produced by a commercial offset press.

And, since we've mentioned halftone screens, what about ordered dither versus halftoning?

The full technical explanation would probably take several pages. But to put it simply, an ordered dither, the technique used by the 4693D, spreads out the color dots more evenly on the page. Halftoning—the ColorScript's approach—clumps them up.

The result is that the 4693D's output in the test blocks looks relatively smooth, that of the ColorScript relatively grainy. This effect is more noticeable on some colors than on others. It also shows up on horizontal and vertical lines. On the 4693D they are straight; on the ColorScript, because of the optical illusion created by the halftones, they often appear jagged or wavy.

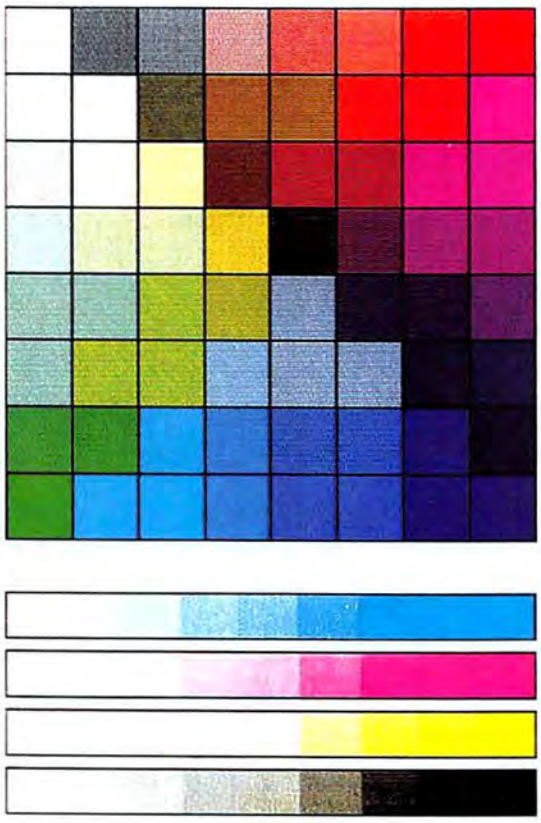
→

. . . Is What You Get

Tektronix 4693D Output



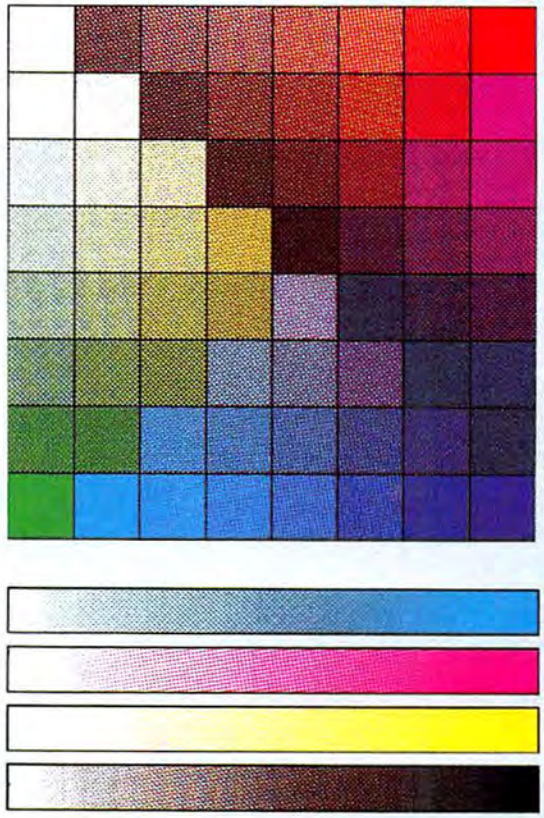
Elizabeth was output directly from MacScan 1.37 in 24-bit mode. The color blocks were output directly from FreeHand. Notice the reduced set of colors in the FreeHand image, a result of the 4693D's printing exactly what FreeHand displays on the Mac screen.



ColorScript 100 Output



Elizabeth was output directly from MacScan 1.37. The color blocks were output directly from FreeHand. Notice the apparent graininess in both images, a result of PostScript's halftoning algorithm. Also, compare the subtlety of the color blocks' color range with the 4693D output.

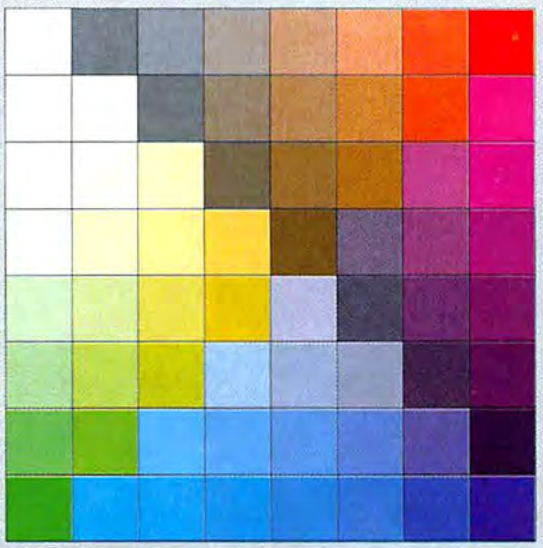


The picture of Elizabeth in each pair of images on these pages is from a 24-bit color TIFF file created with New Image Technology's MacScan driving a Sharp 24-bit color scanner. The color blocks were created in Aldus FreeHand: Cyan increases from top to bottom; magenta from left to right; yellow from the upper-left

Linotronic Separations



Separations for Elizabeth were generated directly from MacScan 1.37 using a 133-line screen, default angles, and default settings for under-color removal. Separations for the color blocks were generated directly from FreeHand, again using a 133-line screen at default angles. (FreeHand does not offer any user control over under-color removal.)

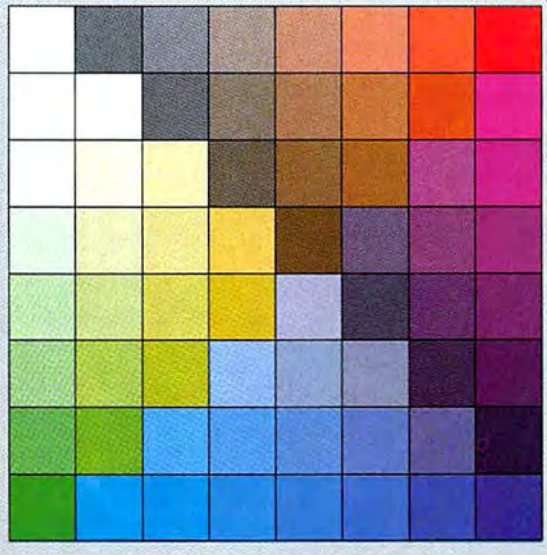




Traditional Photomechanical Techniques



Color separations for Elizabeth were created by our printer using their standard photomechanical color-separation technology. The color blocks were also created by the printer according to CYMK specs that we provided. These specs matched the CYMK values we set in FreeHand. Both images were separated with 133-line screens.



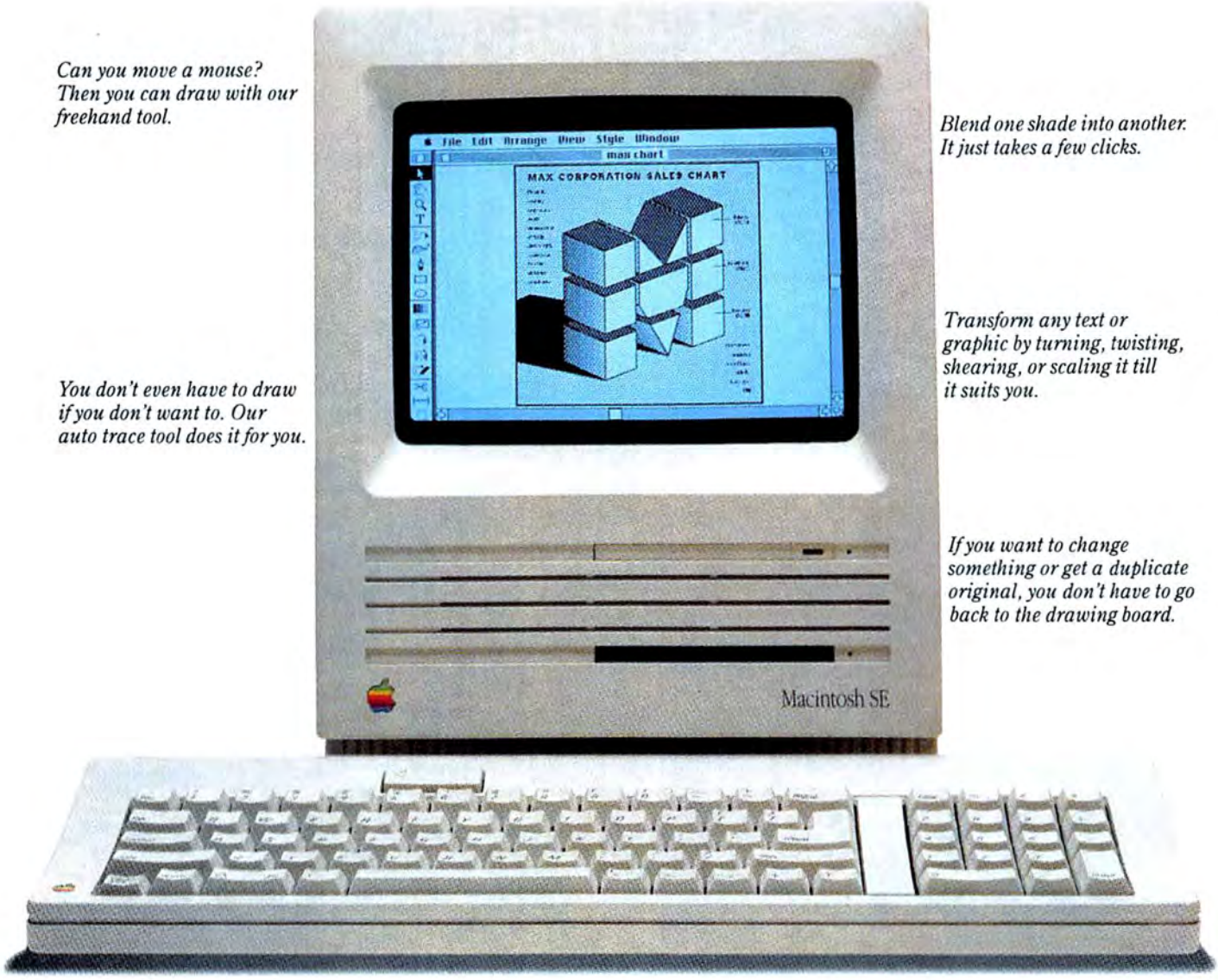


corner to the center; and black from the upper-right corner to the center. The four strips underneath the blocks are 0 to 100% ramps of pure cyan, magenta, yellow, and black. Special thanks to Herb Weiner of Kitchen Wisdom Publishing Company and Mike Fritz of New Image Technology for their help in scanning and outputting the picture of Mike's daughter Elizabeth.

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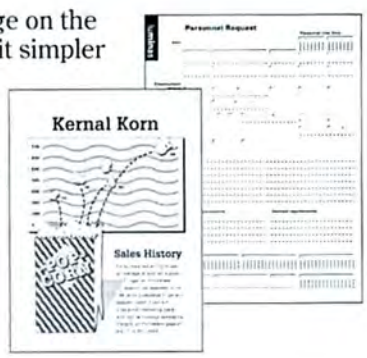
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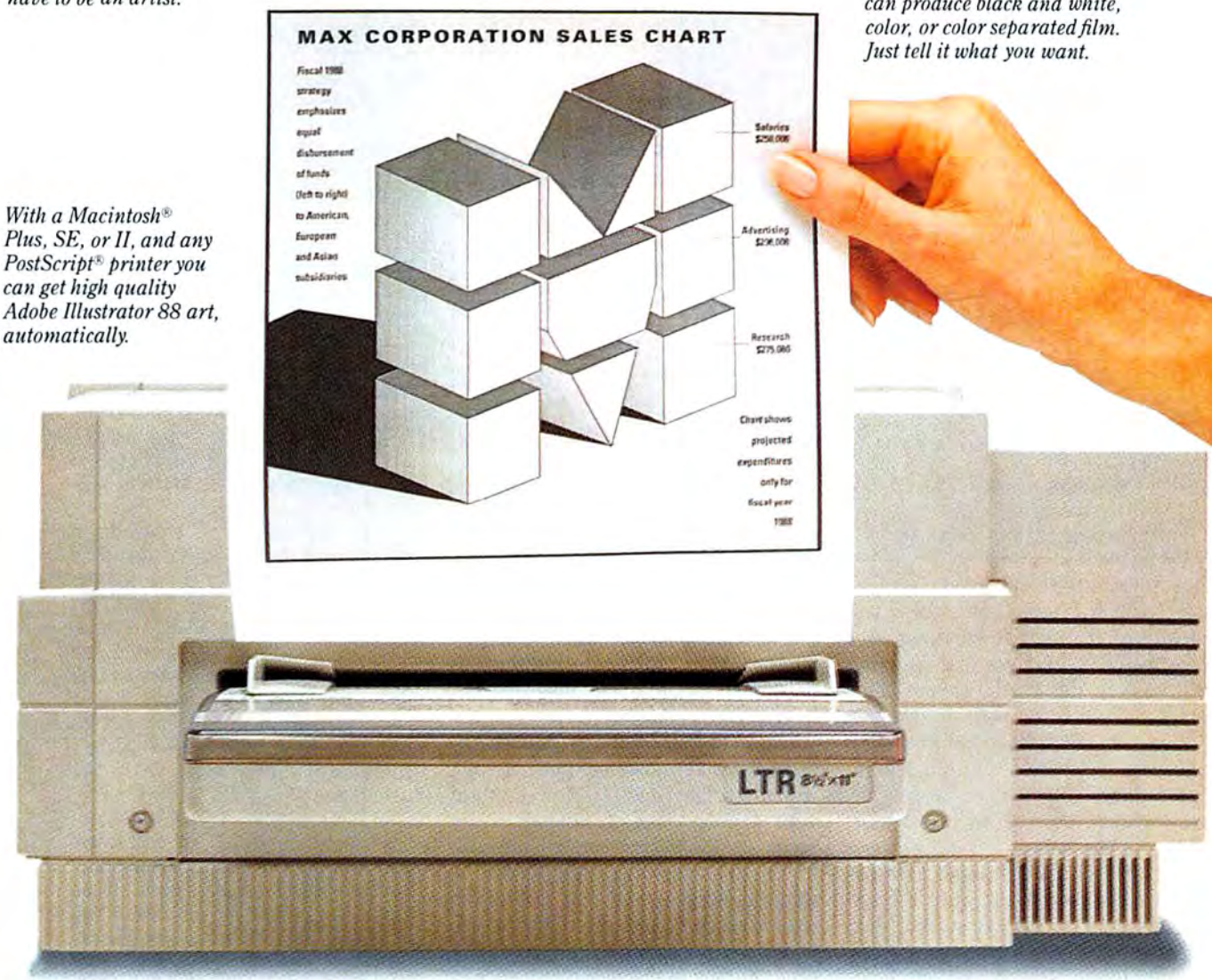
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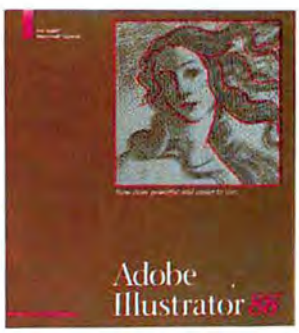


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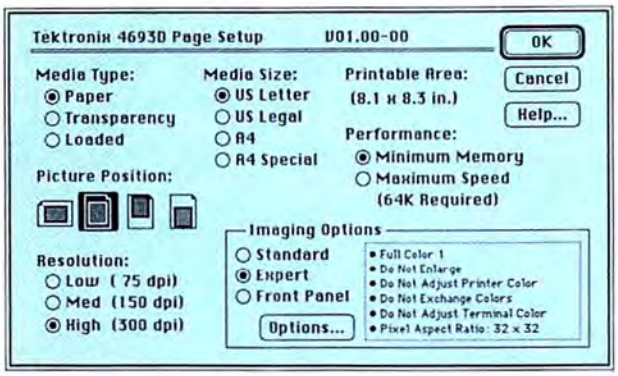
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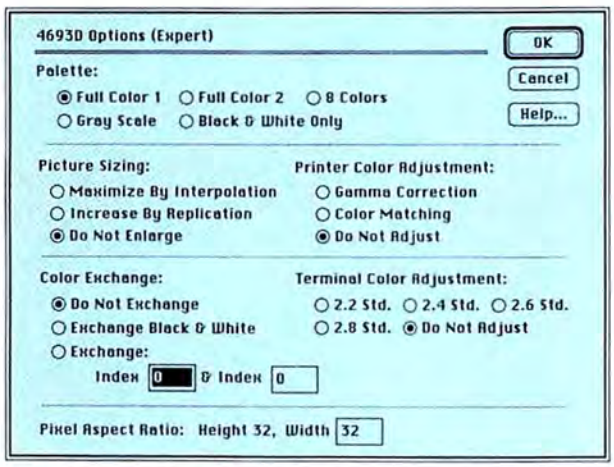


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Here's Looking at Hue





The 4693D printer driver provides custom Page Setup dialogs that allow you to control the printer's functions, including page size, resolution, and, from the Expert dialog, several color correction options.

nally, there is the Color Exchange feature, which supposedly lets you substitute one color for another. But since the colors you are manipulating are those in the Apple system color table, and since the software doesn't give you any idea what the colors in the table *are*, we couldn't exactly call it the most valuable function we've ever encountered. All but a few brave souls will avoid this one.

The 4693D goes through a three-step process when you print to it. First, as it receives the data from the Mac, the driver displays a message on your screen telling you what percentage of your artwork has been transmitted to the printer. Once the transmission is complete, you regain control over your Mac screen, and the printer's LCD panel informs you that it has moved on to the "Imaging" phase, during which the color information from your Mac is converted to dot patterns to be printed on the page. Finally, the printer starts making its characteristic noises, and the printer's display tells you that it is in "Printing" mode, putting hot wax to paper.

The 4693D can work on more than one image at a time. It can, for example, print one image while receiving another. How rapidly all this happens depends on how much memory you have in the printer, how much memory you have in your computer, and whether you print in low, medium, or high resolution. The 4693D comes standard with 4 megabytes of random-access memory (RAM) but can be upgraded to 8 megabytes or 12 megabytes. A minimum of 8 megabytes (Tektronix's recommended configuration for the Mac) is required for printing high-resolution images and will allow queued printing of full-page low- and medium-resolution images. A 12-megabyte configuration also lets you queue high-resolution images. But considering the $2,500 cost of the RAM upgrade from 8 megabytes to 12 megabytes, unless you get the four-port option as well and have several users printing at once, you'll probably find 8 megabytes sufficient.

QMS COLORSCRIPT 100

The ColorScript is perhaps one of

Whaddaya Mean It Doesn't Work?

Although it did not at first occur to us, it turns out that one of the most significant factors in choosing a color printer is whether or not there is software available that supports it. We were surprised to learn that, although the ColorScript has many features to recommend it, most applications can't use it. This may seem strange, considering that it is a PostScript printer, a class of printers that has become closely identified with the Macintosh.

The problem is that what is needed to drive the ColorScript is support for the *color extensions* to PostScript. Because Apple does not yet support color PostScript in its standard LaserWriter driver, and since most applications talk to PostScript printers using only the features offered by this driver (a practice that Apple recommends), what you get from the ColorScript in most cases is, shall we say, less than satisfactory.

Apple has said that it intends to include support for color PostScript in the next release of the LaserWriter driver, which will be part of the next major System upgrade. But, true to form, Apple has not announced any definite plans or dates. Whenever the new driver arrives, the color printing landscape will change dramatically; all color software that follows Apple's rules will then work with the ColorScript.

In the meantime, only a handful of applications — those that implement their own support for color PostScript — can produce usable output on the ColorScript. These include Pixel Paint, Illustrator 88, FreeHand, and Mathematica. (Pixel Paint 1.0 suffers from a bug in its print dialog box, which supposedly allows the user to select a portion of an image too large to print on a single page but which always prints the top left portion of the image, no matter what the user selects. SuperMac had fixed this in a beta version of Pixel Paint 2.0 .)

To test desktop-publishing programs for color support, we imported three files — a color TIFF produced by MacScan, a color PICT from Pixel Paint, and a color EPSF from FreeHand — into each program tested. XPress 2.0 — we looked at a beta

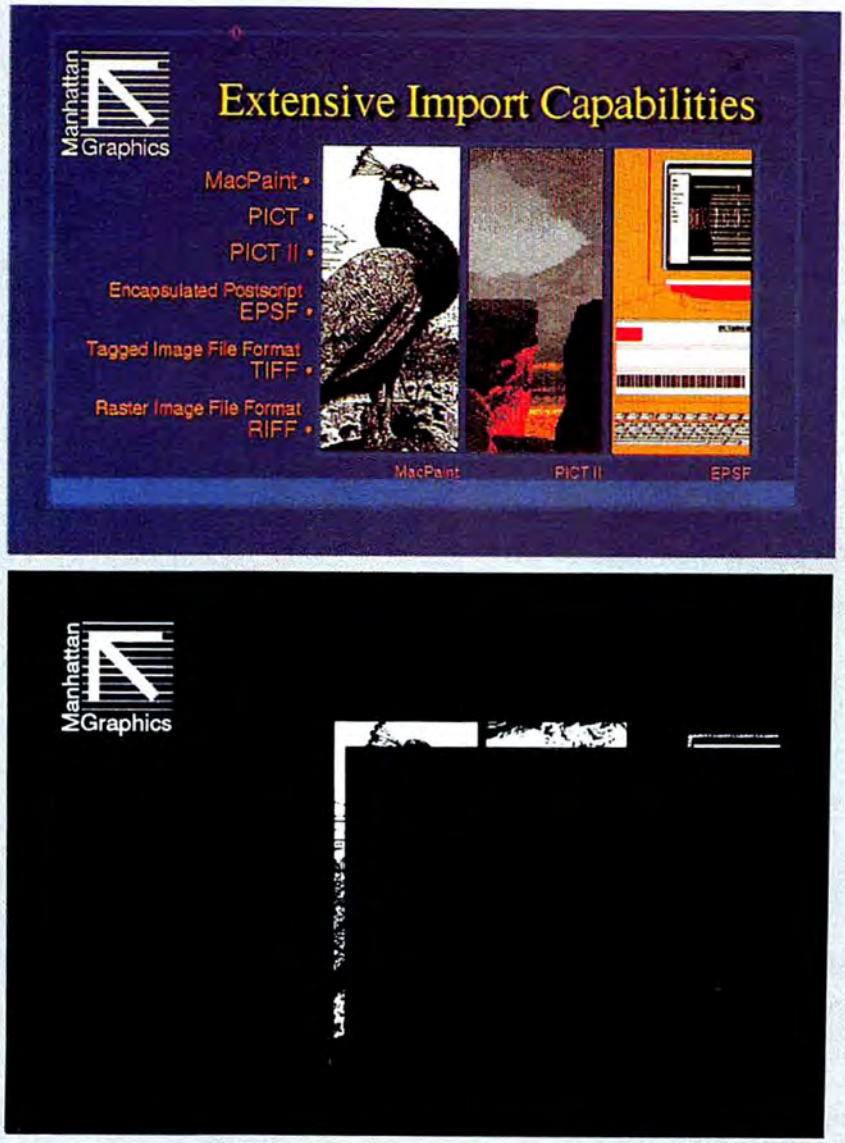
version — was the only program that could successfully import all three files and print them in color on both printers. New Image Technology's MacScan (versions 1.33 and higher), which can drive the Sharp color scanner and save color TIFF images, was being upgraded at press time to support the ColorScript directly. This was working in beta version 1.37.

Cricket's products (Draw, Graph, and Presents . . .) didn't print in color, but they did print tasteful shades of gray. All the other applications we tested on the ColorScript printed hideous high-contrast black-and-white images.

The most disappointing aspect of this problem is this: While the typographic excellence of the ColorScript makes it well-suited to producing color transparencies for overhead projectors, of the three desktop-presentation applications on the market to date — PowerPoint, ReadySetShow, and Cricket Presents . . . — not a single one supports the QMS color printer.

In stark contrast, only one application we tested would not print color on the Tektronix 4693D — Illustrator 88. The reason is simple. Illustrator is PostScript all the way. One other, Cricket Draw, had problems with text.

The chart below lists the applications we tested and the results we achieved. All tests were done on a Macintosh II with 5 megabytes of RAM, running under System 6.0 and Finder 6.1.

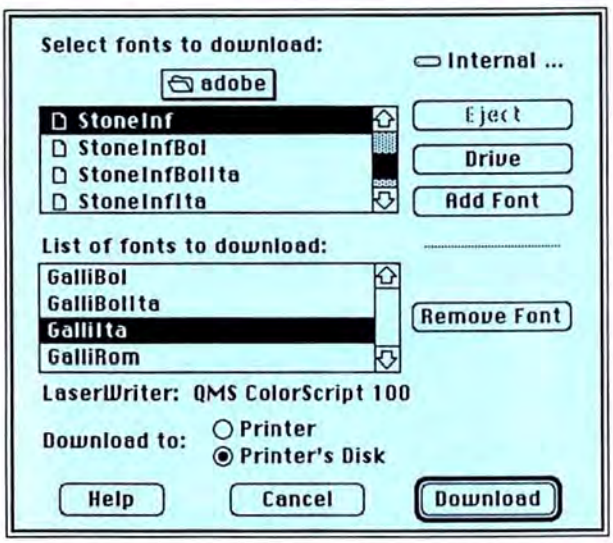


While the 4693D's output of this ReadySetShow slide (top image) doesn't faithfully reproduce the colors displayed on the Mac's screen, it is a far sight better than the ColorScript's rendition of the same image (bottom image). Until Apple releases a LaserWriter driver that supports the color extensions to PostScript, Macintosh applications that do not include custom support for color PostScript are likely to suffer from similar problems.

Tektronix 4693 D	Program/Version	*QMS ColorScript 100*
OK	**Modern Artist/V.87.11.29.jmd**	Doesn't support PostScript printers w/o System 6.0
OK, but selection in Print dialog doesn't work	**Pixel Paint/1.0**	OK
OK	**FreeHand/1.0**	OK
Not supported	**Illustrator 88/1.05**	OK
OK	**MacDraw II/1.0v1**	Prints in gray scale
colors print OK, but text has problems	**Cricket Draw/1.1**	Prints in gray scale
OK	**PowerPoint/2.00**	Prints b&w
OK	**ReadySetShow/1.0**	Prints b&w
OK	**Cricket Presents.../1.0**	Prints in gray scale
OK	**Excel/1.5**	Prints b&w
OK	**Cricket Graph**	Prints in gray scale
Color PICT OK; color EPSF prints w/ reduced color set; color TIFF displays error message when you import	**PageMaker/3.0**	Color PICT prints b&w; color EPSF prints OK; color TIFF displays error message when you import
Color PICT OK; color EPSF prints w/ reduced color palette; color TIFF crashes when you import	**Ready,Set,Go/4.0**	Color PICT prints b&w; color EPSF prints OK; color TIFF crashes when you import
Color PICT OK; color EPSF prints w/ reduced color set; color TIFF prints "chunky" low-resolution image	**XPress/2.0 (beta)**	Prints all three OK; improves on halftone for color EPSF and color TIFF



The ColorScript 100 appears in the list of PostScript printers available on the AppleTalk network when the LaserWriter icon is selected in the Chooser.



Apple's LaserWriter Font Utility, provided by QMS on the System disk that ships with the ColorScript, allows you to download fonts to the printer's internal 20-megabyte hard disk. Unfortunately, QMS's documentation barely even mentions the existence of this invaluable utility and says even less about how to use it. Fortunately, the utility's user interface is highly intuitive and includes on-line help.

the longest-awaited peripherals for the Macintosh. And, at $24,995, one of the most expensive. Has it been worth the wait — and is it worth the money? Well, that depends not only on who's asking the question but also on when they ask it. If you ask it today (this was written in mid-July), a relatively small group of users will be able to answer "yes." Why? Because Apple's LaserWriter driver, on which most applications depend for PostScript printing, doesn't yet support the color extensions to PostScript (see "Whaddaya Mean It Doesn't Work?").

With that caveat out of the way, let's take a look at what the printer is supposed to do — and does quite well with the applications that do support it.

The ColorScript comes in two units: the printer itself and the controller, which sits under the printer. The controller includes a dedicated 20-megabyte hard disk, to which PostScript fonts can be permanently downloaded (more on this later), and a set of three toggle switches with which the user can specify various operating options: paper size, ribbon type, and interface.

Setup is easy, but you have to follow the directions carefully. Again, as with the 4693D, don't take a break in the middle of loading the color ribbon. Also, when you get to the part where you set one of the switches on the controller's front panel for the paper size you'll be using, and the directions don't tell you that "A" is good old 8½-x-11-inch paper, remember that you heard it here first. As with the 4693D, the QMS printer can print either to special coated paper or to transparencies.

The ColorScript supports tabloid as well as letter-size paper. But you cannot blithely switch between the two. Not only do you have to change paper

What's in a Face?

The QMS ColorScript 100, being a PostScript printer, uses outline fonts. A number of these outlines come already stored in the printer. Others can be purchased separately and downloaded to the printer. Outline fonts have the advantage of being scalable to any point size and rotated to any angle while still maintaining sharp character definitions.

The Tektronix 4693D, being a bit-map printer, does not use outline fonts. Instead, for printing characters on a page, it uses the same screen fonts that the Macintosh uses to display text on the screen. These do not lend themselves as flexibly to being printed at a variety of point sizes and rotation angles.

As these examples show, the ColorScript has the definite advantage in this category. There is already a large library of PostScript typefaces available, and those who already own some for use with other PostScript printers will be able to use them immediately with the ColorScript as well.

Tektronix has attempted to address the type problem by providing two disks of large-point-size screen fonts for Times, Helvetica, Courier, and Symbol. Screen fonts for the roman (normal) style of these fonts are provided at various sizes up to 96 points. This allows type in sizes up to 24 points to be printed with reasonable definition (the 4693D uses a screen font four times the size of the printed characters, if it is available). Still, even when printing type at small sizes (in the 10- to 12-point range) the ColorScript's output is superior.

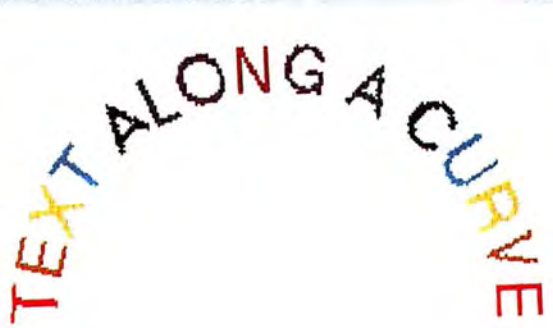
Furthermore, Tektronix doesn't provide any italic, bold, or bold-italic screen fonts. So italic characters printed on the 4693D, especially from serif fonts like Times, look slanty, rather than truly italic; and bold characters don't look bold enough. Adobe makes true italic and bold screen fonts available for its library of typefaces, as do other PostScript font manufacturers, but these typically come only in sizes up to 24 points. Using these screen fonts doesn't get you very far, because the 4693D needs a 24-point screen font just to print 6-point type without jaggies.

To make matters worse, no large-size screen fonts are available from any source — even in the roman type style — for any fonts other than Times, Helvetica, Courier, and Symbol. Compugraphics and Bitstream are rumored to be developing large-point-size screen fonts, including nonroman styles, for a large library of fonts. But at press time, no information was available from either company about when they might be available to users.

And, as you can see, the 4693D does a pretty miserable job of printing rotated type.

Times Roman and Times Bold Italic type set in 6, 10, 12, 18, 24, and 48 points in PageMaker 3.0 and curved Hevetica Bold type created in FreeHand show the stark differences between the 4693D's and the ColorScript's type-handling capabilities.

Tektronix 4693D Output



HybrowS *HybrowS*

HybrowS *HybrowS*

HybrowS *HybrowS*

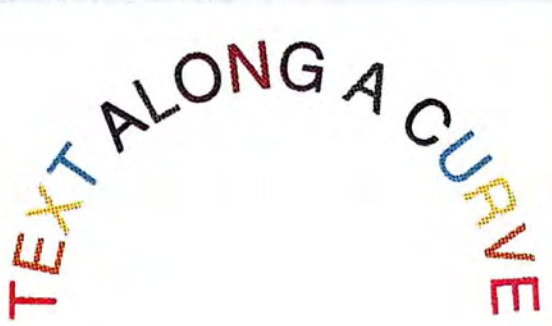
HybrowS *HybrowS*

HybrowS

HybrowS

Type is one of the weak points of the Tektronix printer. Although special screen fonts are provided for some typefaces, small type tends to disappear, large type has noticeable jaggies, italic type is really just slanted roman type, and bold type is not very bold.

ColorScript 100 Output



HybrowS *HybrowS*

HybrowS *HybrowS*

HybrowS *HybrowS*

HybrowS *HybrowS*

HybrowS

HybrowS

Being a PostScript printer, the ColorScript excels at imaging type, at any point size and rotation.

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trays but you also have to change ribbons to go back and forth. This isn't something you want to do frequently. You'll have to choose between wasting tabloid-size paper and ribbon on letter-size images, doing a lot of ribbon changes, or forgoing the tabloid option.

Connecting the ColorScript to your Mac is a snap. Because it's a PostScript printer, you can use standard AppleTalk connectors. Plug and play, as they say in Cupertino. The ColorScript then shows up on the list of available printers when you select the LaserWriter icon in the Chooser. That went by so fast, it's worth pausing to emphasize: It's as easy to connect a ColorScript as it is to connect a LaserWriter. Period.

Of course, the ease of AppleTalk access can be a mixed blessing once everyone finds out there's a color printer available, because anyone on the network can now use it. (The first thing you may want to do is issue an E-mail message warning unauthorized people to stay away. We speak from experience.) Spoolers that work with other PostScript printers should, in theory, work with the ColorScript as well. Unfortunately, the limited testing we performed indicated that it might not be so simple.

When the ColorScript prints, you get the same messages on the screen that you're used to seeing with other PostScript printers. A small red light on the controller blinks to let you know something's happening while the data is being transmitted to the printer. But the fun part is the printing itself. Since there are four colors on the ribbon, it takes four passes through the printer to complete an image. This is true with the 4693D as well, but with the ColorScript, the paper comes two-thirds of the way out of the printer after each pass, then gets pulled back in for the next color. So you get to see the image after each color is laid down. It hasn't gotten boring yet.

Along with the manual for the printer hardware comes a package called PS Exec, which contains a set of utility disks (both for the Mac and for MS-DOS machines) and a manual describing their use. Some of the utilities included are the Namer (for renaming your printer on the AppleTalk network); a set of PageMaker APDs for all of QMS's PostScript printers (with one exception: a ColorScript APD is not included!); and SendPS 1.21 (a PostScript download utility).

Also included on the System disk is Apple's LaserWriter Font Utility. This little software gem lets you permanently download PostScript printer fonts to the 20-megabyte hard disk in the ColorScript's controller. Once a font is on the hard disk, anytime you print a document that uses it, your Mac never has to download it to the printer again, even if you reset the printer in the meantime. What's more, you no longer even need the printer font on your local hard disk — and neither does anyone else on the network. This is a great time-saver. The Font Utility is not documented in the Exec PS manual, and it receives only a brief and confusing treatment in the Read Me file on the System disk that comes with the ColorScript. Fortunately, the utility is easy to use and includes on-line help.

Exec PS didn't ship with the ColorScript we received; it hadn't yet been released. (It was released just prior to press time and sent free of charge to all ColorScript owners.) When we first called to ask how to download fonts to the printer's hard disk, we were told to use Font/DA Mover. Wrong. It took a week of telephone tag to establish that the needed software was on the PS Exec disks, which were subsequently shipped to us.

We chalk this one up to the newness of the ColorScript and the fact that QMS had barely rolled the first ones off the production line when we received ours, let alone had time to train their support staff in its features. We were assured that QMS would correct this problem. Nevertheless, had we not already known how to use the hard disk, neither the QMS documentation nor anything technical support ever told us would have shed much light on the subject. By the way, a portion of the hard disk is also set aside for use as a font cache, which works automatically with no additional software required.

A MATTER OF TIMING

You may be wondering how fast these printers are. And you may be disappointed to find out that we didn't do any extensive timing tests. In our opinion, it's too early in the development of 300-dpi color printers to worry about speed. But here are some rough guidelines. Both printers take about a minute to print a full 8½-x-11-inch page of average complexity. This is a gross oversimplification and is intended only as a ballpark figure.

At the Margins

Both the Tektronix 4693D and the QMS ColorScript 100 use a four-color ribbon that requires each page to pass through the printer four times. While both printers can print to within about ¼ inch of the left and right of the page, they both require large top and bottom margins where no printing can be done. These top and bottom unprintable areas are used by the grippers that pull the paper back and forth as each successive color is laid down.

It would be nice if applications took these margins into account when indicating the printable area of a page on the Mac's screen. Sadly, almost none do. You will likely learn the hard way that you can't trust the margin indicators set by applications to prevent your artwork from being clipped at the top and bottom.

These diagrams show you what the printable areas are for each type of paper available for the two printers. You can use them as guidelines to set correct margins manually.

A tip: In FreeHand's Printer Setup dialog, there is no ColorScript 100 option in the printer list, and most of the printers listed do not offer a tabloid option. If you want to use a tabloid-size page, choose the Dataproducts LZR 2665; then select tabloid.

Another tip, or rather a warning: As we went to press we discovered that Illustrator 88 doesn't appear to support tabloid-size pages on the ColorScript very well. Thinking we'd outsmart the reluctant program, we tried tiling 8½-x-11-inch pages. No luck. We found that significant strips of our artwork were missing along each edge where the drawing overlapped from one page to another.

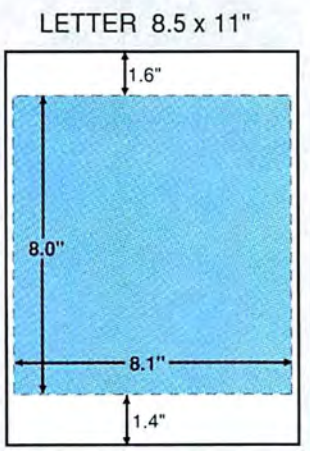
With the 4693D, a number of factors affect printing time. Bit maps are faster than vector graphics, and the more complex a vector (object-oriented) graphic is, the longer it will take. The lower the resolution selected by the user, the shorter the printing time. Scaling options available in the Page Setup dialog also have an effect. Some images even print within a few seconds.

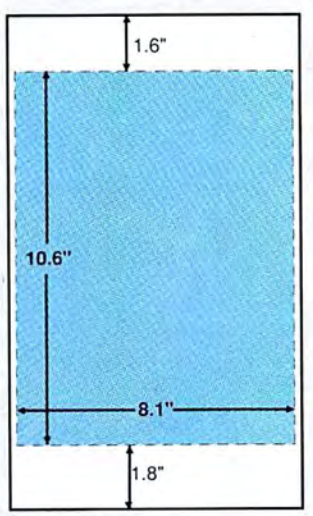
With the ColorScript, bit maps do not print faster than object-oriented drawings; in fact, PostScript takes longer to process bit maps than simple vector drawings. There are no resolution settings to choose from, and scaling an image in the Page Setup dialog has no effect on printing time. One important factor is the typeface. Fonts that are downloaded to the printer's hard disk will print faster than those that must be downloaded by the Mac before being used. Likewise, fonts that have been used at a particular point size and rotation in a previous document, and that are therefore stored on the hard disk's font cache, will be imaged more quickly than those that are being printed for the first time.

WHICH ONE SHOULD I BUY?

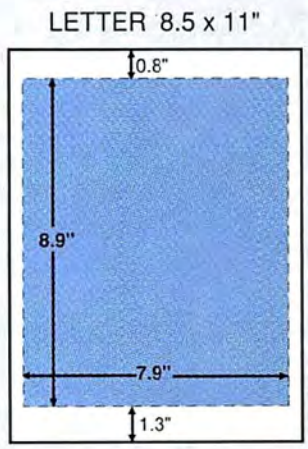
That is not an easy question to answer. The 4693D has better-looking, although not necessarily more accurate, colors. It is well-supported by almost every color application on the Macintosh (Illustrator 88 and Cricket Draw are notable exceptions). It is sig-

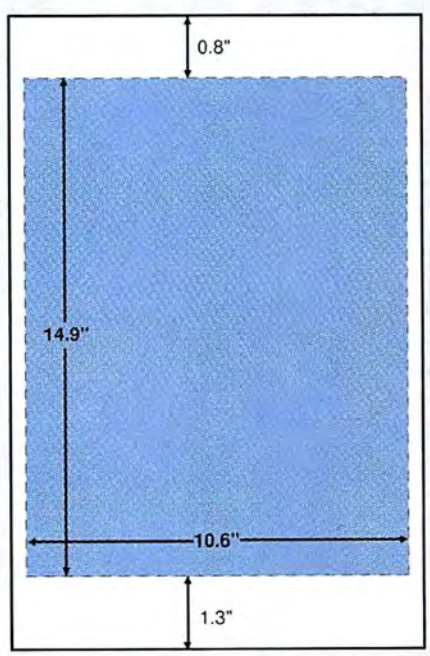
Tektronix 4693D Color Printer





QMS ColorScript 100





Here's Looking at Hue

nificantly cheaper. If you can live within the restrictions of bit-mapped type, you'll probably be satisfied with this choice.

The ColorScript is a very high-ticket item. The value of this printer will increase dramatically when Apple releases a LaserWriter driver with color PostScript support. If you choose to buy it now, you should do so with full knowledge that it currently works with only a limited number of applications. Still, this short list includes Illustrator 88, FreeHand, and Pixel Paint, some of the most important programs for color work. XPress 2.0, not yet released at press time, will also provide full support for the ColorScript.

Because it's a PostScript printer, the ColorScript does a more precise job of rendering curves than the 4693D is capable of. Text also looks better on the ColorScript, and if your work is text-intensive, this will probably be the printer you want. Its halftoning method allows for more subtle shades of color from some applications, but the colors tend to look more subdued and grainier.

And that's as close to telling you which one to buy as we're going to get. Our final advice to the wise shopper: Try before you buy.

HENRY BORTMAN IS A SENIOR TECHNICAL WRITER FOR MACUSER AND PROMISES THAT THIS IS NOT THE LAST TIME YOU WILL HEAR FROM HIM ON THE SUBJECT OF COLOR PRINTERS.

The Bottom Line

Buying just the Tektronix 4693D Color Image Printer will set you back $8,495. Not too bad, all things considered. But you also have to consider that you can't use it with a Mac II without also buying the Option 44 Macintosh II Printer Interface Kit at $495, which brings the total to $8,990.

On top of that, Tektronix recommends that you also purchase the Option 34 RAM upgrade (which brings your printer memory to a total of 8 megabytes). This little item will set you back another $2,500. When you add that to the price of the printer and Option 44, you get a grand total of $11,490.

Still, that's a mere pittance compared to the cost of the ColorScript 100. At $24,995, the QMS printer weighs in at more than twice the price.

The accompanying chart details the cost of various options, supplies, and maintenance agreements for the two printers.

Tektronix 4693D Color Printer

Tektronix, Inc.
P.O. Box 500
Beaverton, OR 97077
(800) 225-5434

4693D Color Printer	$8,495
Macintosh Interface Kit - Option 44 (required)	$495
8 Mb total printer memory - Option 34	$2,500
12 Mb total printer memory - Option 38	$5,000
Four-channel Multiplexer - Option 2	$2,500
Letter-size paper (1,000 sheets)	$50
Legal-size paper (1,000 sheets)	$60
Letter-size transparencies (50 sheets)	$55
Four-color ribbon (1 cartridge)	$85
Monochrome ribbon (1 cartridge)	$125
Installation and setup	Included
One year on-site coverage for repairs	$607
Two years on-site coverage for repairs	$1,289
Three years on-site coverage for repairs	$1,715

QMS ColorScript 100

QMS, Inc.
One Magnum Pass
Mobile, AL 36618
(205) 633-4300

ColorScript 100 printer	$24,995
Letter-size paper (2,000 sheets)	$125
Tabloid-size paper (2,000 sheets)	$220
Letter-size ribbon (black, three-color, or four-color; box of 4)	$360
Tabloid-size ribbon (black, three-color, or four-color; box of 4)	$360
Letter-size transparencies (box of 200)	$205
Tabloid-size transparencies (box of 200)	$325
Factory service (annual)	$1,785
On-site service (annual)	$2,975



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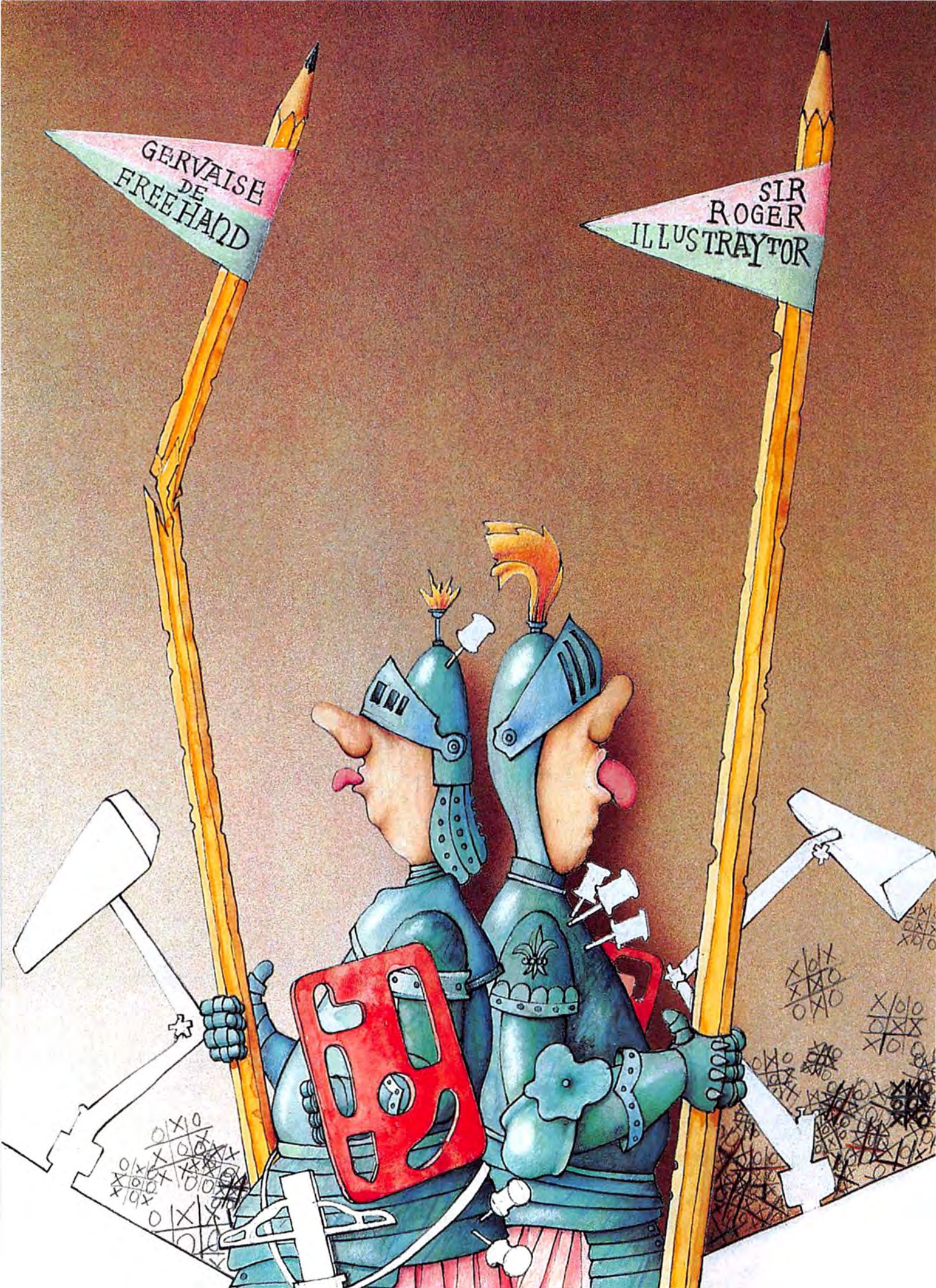
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Call It A Draw

It was a photo finish, and Illustrator 88 and FreeHand came out of our tests as equals. See how speaking a different language has enabled these two programs to go well beyond the early art programs.

Art programs for the Mac, like good wine, improve with age. Look at the beginning of art on the Mac — MacPaint and MacDraw. These two programs generated a lot of excitement in the Mac community when they appeared. In the time since the debut of these programs, Adobe created an entirely different, much more powerful drawing language. We are indeed talking about PostScript. And today, you'll find it in two of the most exciting art packages on the market: FreeHand, from the Aldus Corporation, and Illustrator 88, from Adobe Systems. With the PostScript drawing tools, these programs offer remarkable new potentials for Mac artistry.

In the past, you might have been able to accomplish some of the tasks that these drawing programs are capable of, such as drawing complex curves, by using a high-end graphics or CAD system that cost more than $50,000. This puts the list prices of FreeHand ($495) and Illustrator 88 ($495) into perspective. Both applications let you draw and edit complex curves easily: a task that's not possible with other personal computer drawing and painting applications, and a task that higher end CAD systems complicate. They also generate graphics in PostScript, the page-description language that's become a standard for publishing systems.

WHAT'S SO GREAT ABOUT POSTSCRIPT?

PostScript is supported by a growing number of page-layout applica-

BY DIANE BURNS AND S. VENIT

KEVIN O'SHEA

Call It A Draw

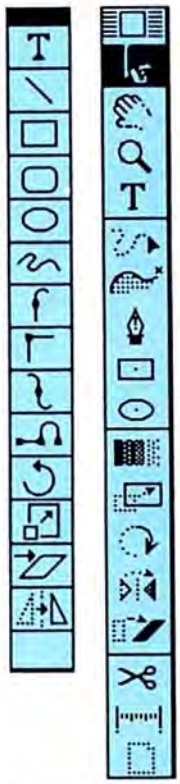
tions, laser printers, and phototypesetters. PostScript describes graphics the same way it defines fonts: The outline of each object or letter of the alphabet is defined in mathematical formulas that describe complex Bezier curves. One advantage that this approach has over bit-mapped page description is that space requirements are economized. For example, by storing only one set of outlines of characters for a typeface, you can print text in any size. Similarly, a PostScript version of a graphic requires a small fraction of the amount of space that would be required by a scanned image of the same graphic.

Before the original version of Adobe Illustrator was released, the only way to create PostScript graphics was to code them yourself. Programmers could write PostScript code directly to define a graphic and print the graphics on any PostScript-capable printer. Similarly, you could buy PostScript fonts and use an application's menu selections to format text. But to get at many of the special, powerful typographic effects supported by PostScript, you would have to write the procedure yourself.

The power of PostScript was first captured in drawing tools by the original Illustrator, released in March 1987. Illustrator's features were so revolutionary at the time that many graphic designers who had resisted desktop publishing, from one-man graphics studios to Madison Avenue's slickest ad agencies, finally embraced the Macintosh. The program also had strong appeal as a tracing tool to corporate desktop publishers, giving them the ability to recreate corporate logos and other existing hand-rendered artwork for which the closest electronic alternative, a scanned bit-map image, was a poor substitute.

Of course, if all you want is an exact duplicate of an image, why not paste up a photostat of the original artwork? One good reason is because these drawing tools let you alter PostScript graphics in many powerful ways. You can electronically scale an image to any size, and you can reshape, reshade, mirror, rotate, and skew your artwork as you like.

Since the initial release of Adobe Illustrator, the world of Macintosh graphics has opened further with the advent of the Macintosh II — a more powerful CPU, expanded video options, and the ability to display color. Aldus FreeHand was designed to take full advantage of color, and it added some features supported by PostScript that weren't incorporated in Illustrator 1.1. Illustrator 88 adds features first introduced by FreeHand, as well as new features not offered by any other application. Priced as they are, these packages come in at the high end of drawing applications for the Macintosh. And the differences between them are significant enough that serious graphics studios will want both in order to get the full range of capabilities.



FreeHand (left) and Illustrator 88 (right) have similar tool palettes. They also use similar keyboard short cuts for pointing, zooming, and moving the page.

CAN YOU TELL THEM APART?

Adobe Illustrator 88 and Aldus FreeHand are similar in many ways. The programs have similar tool palettes, and they use many of the same keyboard short cuts, including conventions for essential operations like pointing, zooming, and moving the page. Both programs let you draw smooth curved lines, set the lines to any width, and fill lines or solid objects with any percentage of black or color. You can perform transformations on graphic objects or type: scale an object to any size, rotate an object any number of degrees, reflect or mirror an object across any angled axis, and skew the axes of an object.

Both programs offer easy access to PostScript capabilities like masking, which gives you the ability to silhouette a part of an image inside any outline shape you draw. You can also define custom patterns and colors to be used as fills for lines or solid shapes.

With both Illustrator 88 and FreeHand you can print your art and use it directly as camera-ready art. Or you

BENCHMARK CHART

Task	Mode	FreeHand	Illustrator 88
Refresh screen	Preview	7.44 sec	2.05 sec
Refresh screen	non-Preview	4.42 sec	1.10 sec
Switch from non-Preview to Preview mode	Both	5.76 sec	5.83 sec
Zoom from Fit in Window to next zoom level	Preview	12.32 sec	8.03 sec
Print to LaserWriter Plus using built-in font	N/A	187 sec	117 sec
Print to LaserWriter Plus using downloadable font	N/A	170 sec	105 sec

All tests were conducted using the same file in both products on Macintosh II with an 8-bit color monitor, 5 megabytes of RAM. All tasks were clocked three times; average time is shown.

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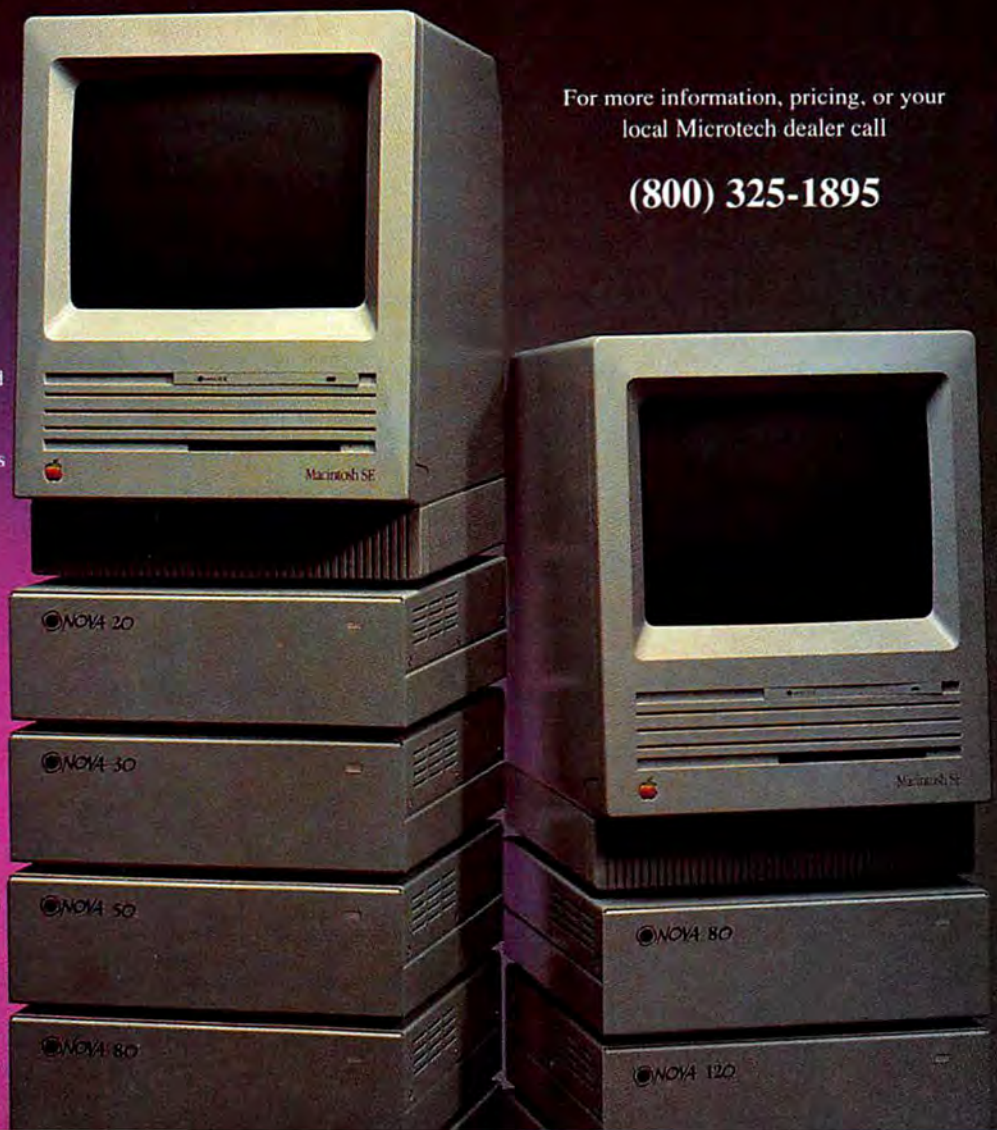
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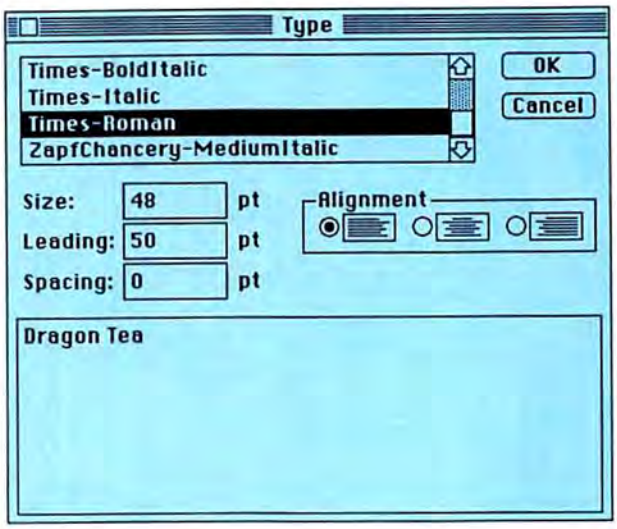
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can import the artwork into page-composition applications that support PostScript and EPS (Encapsulated PostScript) graphics, including PageMaker, Ready, Set, Go! 4.0, and QuarkXPress on the Macintosh, and PageMaker and Ventura Publisher on MS-DOS systems (after first transferring the EPS files from the Macintosh).



To handle text in either FreeHand or Illustrator 88, you type it into a dialog box instead of directly on the text.

IT'S DONE WITH WIRES

Both FreeHand and Illustrator 88 enable you to draw in a wire-frame mode and to preview the image as it will print. One of the most fundamental differences between the two programs is that FreeHand lets you work in either mode, whereas with Illustrator 88 you must always work in wire-frame mode, as the Preview mode in Illustrator 88 doesn't allow editing.

FreeHand's ability to work in Preview mode gives the program the "look and feel" of other drawing applications like MacDraw. For example, to resize an object in FreeHand, you can simply point and drag one of the corner handles, just as in MacDraw. This makes FreeHand easy to learn if you already have experience with other graphics applications. Casual users might validly choose FreeHand over Illustrator 88 for this difference alone, and choose always to work in Preview mode. Illustrator 88's wire-frame operations — with anchor points and direction lines — can seem difficult by comparison, though you have the option of Previewing in a separate window on the screen as you work.

The disadvantage of working in Preview mode is that the relatively thick lines of a drawing, when depicted as actual artwork on screen, are more difficult and less precise to work with than pixel-wide wire-frame lines. For more detailed artwork, the time it takes for the screen to redraw is always much longer when working in Preview mode as well. This becomes significant when you are working with complex drawings, and FreeHand users will be aggravated to discover that screen redraw is slower in any mode when compared with Illustrator 88 (see the accompanying Performance Chart). For these reasons, many artists will choose to work in wire-frame mode and turn Preview on only periodically to check their work. Nevertheless, there is still a tremendous advantage in being able to make changes in Preview mode directly, and we think Illustrator 88 suffers by not offering this as an option.

FreeHand	Feature	*Illustrator 88*
6	Zoom levels	8
8	Undo levels	1
yes	Allows bit maps to be traced	yes
no	Automatic tracing	yes
no	Freehand drawing tool adjustment	yes
no	Erase freehand line	yes
no	Blending	yes
yes	Bind text to a path	no
yes	Color separation	yes, with separator
yes	Change anchor point type	no
yes, by entering PostScript code	Patterns	yes
no	Preview patterns	yes
yes	Masking	yes
yes	Imports EPS files	yes

This is not intended to be an exhaustive list of features. Rather, it is meant to highlight the features that are different between the two programs or features that are more advanced PostScript features.

TRACING THE IMPORTS

Both programs let you trace an image or draw from scratch. In Illustrator 88, you can trace an image by opening any bit-mapped or PICT file as a "template" — artwork that you can see on the screen but that won't print or show in Preview mode. You can then trace this template by using any of three tools: a pen tool that you click and drag at selected points along the path of the template, a freehand tool that you use to draw over the template, or an autotrace tool that you click to generate an outline of any continuous edge in the template. The template can be hidden from view or eventually discarded, but the template image cannot be moved or scaled in Illustrator 88 directly. The FreeHand tool and Pen tool can also be used to draw without a template, along with the rectangle and oval tools. Once a path is drawn, you can edit it by dragging part of the curve, moving an anchor point along the curve, or moving a direction handle

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PT-5 Macintosh Overview (11/1; 8:00)
PT-6 Hands On *Excel* (11/1; 8:00)
PT-7 Hands On *Microsoft Works* (11/1; 1:00)
PT-8 Hands On *HyperCard* (11/1; 1:00)
PT-9 Macintosh Overview (11/2; 8:00)
PT-10 Hands On *Excel* (for intermediate to adv. users; 11/2; 8:00)
PT-11 Hands On *HyperCard* (for intermediate to adv.; 11/2; 1:00)
PT-12 Hands On *MacDraw* (11/2; 1:00)
PT-13 Hands On *PageMaker* (11/3; 8:00)
PT-14 Hands On *Cricket Presents* (11/3; 8:00)
PT-15 Hands On *Adobe Illustrator* (11/3; 1:00)
PT-16 Hands On *MacProject II* (11/3; 1:00)

3. FULL-DAY EXECUTIVE SEMINARS

The Power Macintosh Office: A Complete, No-Nonsense Guide
(Repeated Nov.1 & 2; 8:00 - 3:30. Code: ES-1 and ES-2)
Hardware configurations, networking; E-mail, training, software and security issues: Everything you need to know to launch and administrate the Power Macintosh Office. Why learn important lessons and strategies the hard way? This Executive Seminar can save months of indecision and thousands of dollars for your business.

The MIS/DP Connectivity Round-table
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☐ ES-3 MIS/DP Roundtable - 11/3, 8:00	$495*	$395*
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☐ PT-2 Accounting & Finance - 11/2, 1:00 PM	$295**	$225**
☐ PT-3 Admin. & Management - 11/3, 8:00	$295**	$225**
☐ PT-4 Sales & Marketing - 11/3, 1:00	$295**	$225**
☐ PT-5 Macintosh Overview - 11/1, 8:00	$295**	$225**
☐ PT-6 Hands On Excel - 11/1, 8:00	$295**	$225**
☐ PT-7 Hands On Microsoft Works - 11/1, 1:00	$295**	$225**
☐ PT-8 Hands On HyperCard - 11/1, 1:00	$295**	$225**
☐ PT-9 Macintosh Overview - 11/2, 8:00	$295**	$225**
☐ PT-10 Hands On Excel (Adv) - 11/2, 8:00	$295**	$225**
☐ PT-11 Hands On HyperCard (Adv) - 11/2, 1:00	$295**	$225**
☐ PT-12 Hands On MacDraw - 11/2, 1:00	$295**	$225**
☐ PT-13 Hands On PageMaker - 11/3, 8:00	$295**	$225**
☐ PT-14 Hands On Cricket Presents - 11/3, 8:00	$295**	$225**
☐ PT-15 Hands On Adobe Illustrator - 11/3, 1:00	$295**	$225**
☐ PT-16 Hands On MacProject II - 11/3, 1:00	$295**	$225**
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that defines a part of the curve. All drawing and editing must be done in wire-frame view.

In FreeHand, you can trace artwork that is brought in through the Clipboard. Artwork brought in this way can be moved and scaled before it is traced, but it won't print out or display in Preview mode. Tracing and drawing tools include a FreeHand tool and four pen tools that must be used in combination. FreeHand doesn't offer an autotrace feature, nor is the sensitivity of the FreeHand drawing tool adjustable, as it is in Illustrator 88.

In both applications you can create and modify objects visually on the screen, or you can use dialog boxes to define transformations numerically: distances and angles for moving; percentages for scaling; and angles for rotation, mirroring, and skewing.

You can also import EPS graphics into both applications. The template can be hidden from view, or eventually discarded, but the template image cannot be moved or scaled in Illustrator 88 directly.

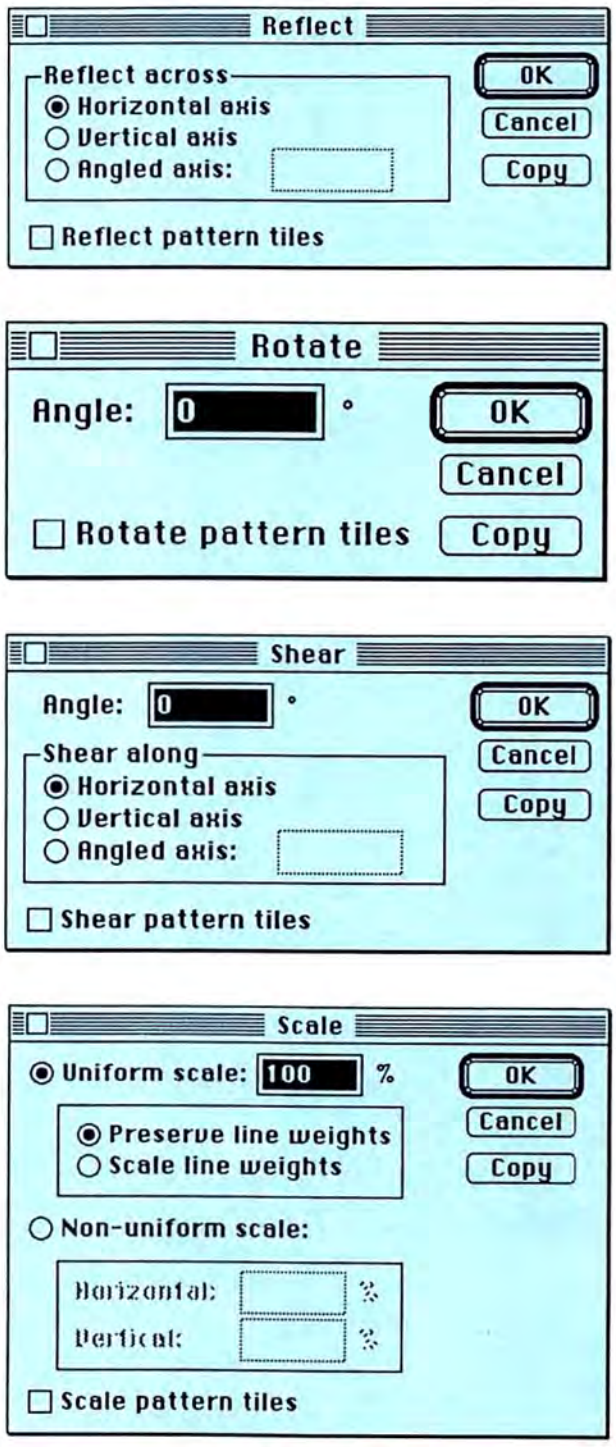
FILLING THE BILL

Both Illustrator 88 and FreeHand let you define a line or a fill pattern as any percentage of black (shades of gray), any color (from the colors provided or custom colors), or any pattern that you design yourself (neither product comes with predefined patterns). Graduated fills, called fountains in PostScript terminology, can be automatically generated by FreeHand. In Illustrator 88 there is no automatic graduated fill or fountain, but you can create the effect of a fountain by using the blending tool.

Custom patterns are another area where FreeHand and Illustrator 88 have taken different approaches. Custom patterns can be created in Illustrator 88 simply by drawing a rectangle around any artwork or portion of artwork that you wish to make into a pattern and invoking a menu command to define the new pattern. In FreeHand you can create custom patterns by writing PostScript code. This is easy enough for those who know PostScript or for the simplest of patterns, but it's difficult and awkward compared with Illustrator 88's right-brained implementation. The repeats — getting each tile pattern to line up with all adjacent tiles — can be difficult in either case.

IN FULL COLOR

Both FreeHand and Illustrator 88 make handling color easy. You can define colors in terms of percentages of cyan, magenta, and yellow, then name the color and save a list of colors to a file. FreeHand calls these files Libraries, and Illustrator 88 saves them as regular Illustrator 88 files. This feature also serves as a color style sheet in



Dialog boxes come into play when you handle transformations in FreeHand and Illustrator.

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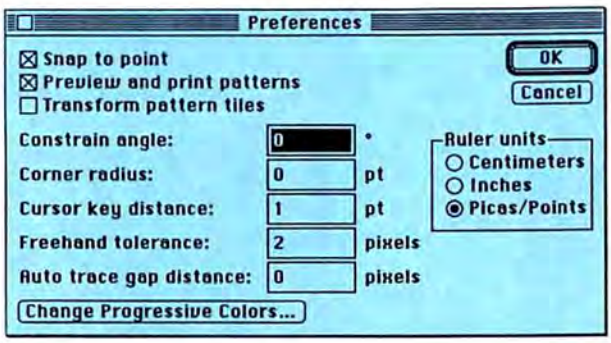
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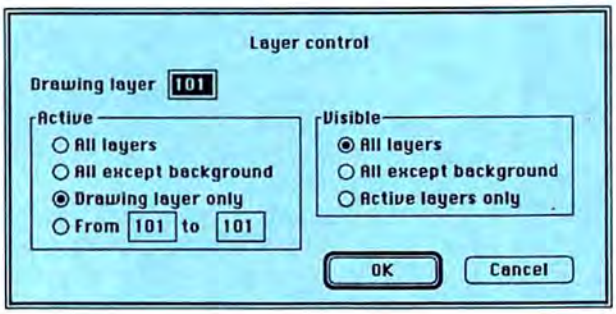
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Call It A Draw



In the Preferences mode in Illustrator 88, you can adjust the sensitivity of the Freehand tool and the Auto trace tool.



In FreeHand, you can lock or hide selected layers rather than selected objects. FreeHand offers 200 different layers.

the sense that when you make a change in the definition of a color, all the objects in the current file that have been designated with that color name automatically change to the new definition.

Illustrator 88 ships with all the colors in the Pantone Matching System. FreeHand ships with two predefined color libraries. Both programs let you print out full-color images on color PostScript printers, or print black-and-white color separations on laser printers or PostScript typesetters. FreeHand will print to any QuickDraw printer, which includes Apple's LaserWriter SC and the Tektronix thermal color printer.

MANAGING TEXT

Text handling is quite a mixed bag; this is an area where the combination of both products can truly be appreciated. The approaches of the two look similar initially in that when you use the text tool you type into a dialog box rather than directly on the page.

Illustrator 88 offers the same limited text-handling features of its earlier versions. Specifically, you are limited to 255 characters per text block, you must force line endings with hard carriage returns, and you can't mix type styles within any single block. You can align text left, right, or centered, but you can't justify text. The option labeled "kern" in Illustrator 88's text dialog box would be more accurately called "tracking" — the same amount of space is added or removed between all letters in the text block, rather than actually kerning selected pairs of letters. The Illustrator 88 text dialog doesn't even contain a scroll bar.

FreeHand has much more flexible text-formatting features. It is capable of controlling the most essential formats within a single block of text, including automatic word wrap (including when you change the width of the block); four alignment options including justification; and both forms of inter-letter spacing control (tracking and kerning). You can also mix different fonts, text styles, sizes, and colors within a single block of text.

Another PostScript feature that FreeHand makes available is the ability to bind text to an arbitrary path. This feature is useful when the baselines of the letters within one word or phrase do not fall on a straight line, as in package labels on many products. To achieve this effect, Illustrator 88 requires that you literally hand-place each letter individually, but in FreeHand you simply draw a curve, which can be smooth or wavy, and then invoke a single command to constrain the baseline of text you've typed to the shape of the line drawn. Text binding is one of those things that you may not need to do every day, but if you need the feature, it's good to have a product that does the hard part for you.

Yet with all these advantages, FreeHand is missing one very important feature that is available in Illustrator 88: the ability to change the width and pen-fill of the outlines of letters, and to define the fill patterns of these characters. This feature is required for certain special effects. In both applications you can produce other types of special effects or custom type, since text — just like graphics — can be rotated, mirrored, or skewed to any angle.

ON TOP OF EACH OTHER

One factor that comes up in any drawing program when you are working with complex images is that of grouped objects and layers. Both FreeHand and Illustrator 88 provide Group, Ungroup, Send to Back, and Bring to Front commands as methods of arranging or rearranging layered objects, but working in complex layers is made even easier by the option of locking or suppressing a view of selected elements. Here again, Adobe and Aldus have taken different approaches.

With Illustrator 88, you can Lock a selected group of objects. Locked objects display on the screen and print, but they can't be selected or edited until Unlocked. In addition to the locking feature, the program also gives you the ability to Hide selected elements. Hidden elements can't be selected or edited, and they aren't displayed on the screen in wire-frame mode. You can't selectively Unlock (or Unhide) objects — all locked (or hidden) objects are unlocked (or unhidden) at once by the Unlock command.

In FreeHand, you can lock or hide selected *layers* rather than selected objects. FreeHand offers 200 different layers, each of which can include any number of complex objects, composed of elements that fall in front of or behind others. The Send to Back and

STORAGE



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Bring to Front commands are used to arrange elements within these layers. In addition, whole layers can be selectively locked (hidden) or rearranged.

ILLUSTRATING PERFORMANCE

We compared the performance of these two packages by timing several common operations. First, we measured the time required for the screen to redraw. The longer you have to wait for the screen to redraw, the greater the interruption to the creative process and the longer the overall production time.

The second important measure for a graphics program is the speed with which a file can be printed. Illustrator 88 is the clear winner in both regards. It redraws the screen in all modes much faster than FreeHand, and prints faster as well (see benchmarks).

One of the features that Illustrator 88 has for which FreeHand has no equivalent is a Blending tool. The Blending tool can be used to combine any two objects, even of different shapes, in a user-definable number of iterations.

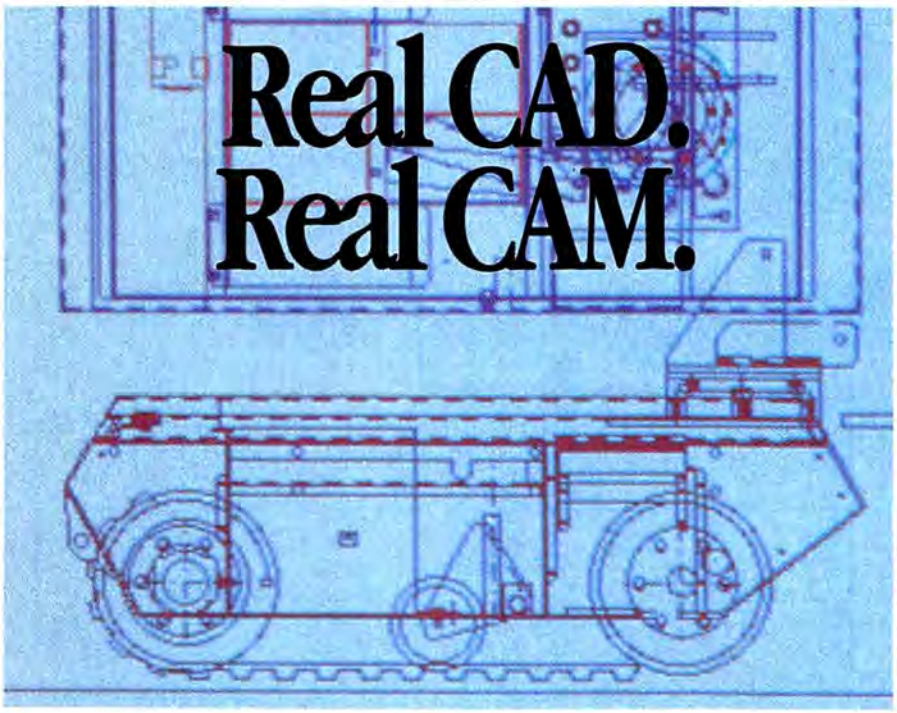
While using this tool is more cumbersome for producing the graduated screens that FreeHand does automatically, it does make it possible to combine other elements besides colors. Since you can blend two differently shaped objects, you can, for example, blend the shape of an object into the shape of a letterform, or produce simple animation.

DRAWING CONCLUSIONS

The most important characteristic for any program, of course, is stability. Both FreeHand and Illustrator 88 rate well — neither program has crashed or manifested any serious bugs throughout our extensive trials, and both products are backed by companies that have built good track records for reliability and support. But after reliability come other, perhaps more subtle, criteria for evaluating performance in a drawing program. These are two different products, originally aimed at two different markets: Illustrator 88 for professional graphic artists, FreeHand for nonprofessionals.

We can expect a convergence of approaches in upcoming versions of both products. But as is true in natural selection, in diversity there is strength. Certain aspects of FreeHand and of Illustrator 88 will continue to evolve in two different directions — with corresponding benefits to their users. More importantly, as two of the most powerful, important pieces of PostScript drawing packages today, they have laid the foundations for the packages of tomorrow.

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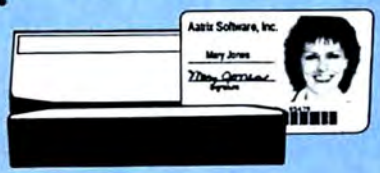
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PORTRAITS OF THE ARTISTS

BY JON ZILBER

The artists on the following pages have many things in common. They share the frenetic pace of managing multiple projects simultaneously, while organizing and preparing for the next one in their spare time. They must somehow balance their search for inspiration and innovation with the demands of deadlines and dejection. And they also have one other thing in common: They've discovered a tool that can assist them with both the artistic and administrative aspects of their work: the Mac.

Here's a behind-the-scenes glimpse at several Mac artists: a magazine illustrator, a software look-and-feel designer, a graphic artist, a songwriter, a photographer, a journalist, a musician, an editor, and a record producer. The amazing thing is that we're profiling only four artists — but each of them wears many hats.

The community of Macintosh artists is still small and tight-knit. Artists working in different disciplines often know one another through their Mac connection, and it can open new artistic doors. Thanks to the Mac, they can pursue all the different directions where their artistic visions lead. In pre-Mac days, most artists focused their talents on a single medium and specialized in a particular style. A skilled painter couldn't easily transfer those skills to music or dance. With the Mac interface, however, it's much easier to dabble in more than one medium; there are music tools, for example, that a graphic artist can use to turn visual patterns into sound. And someday in the not-too-distant future, you might even be able to export a MacPaint file directly into MIDI format or vice versa, adding new meanings to the term multimedia.

The Mac also opens new artistic doors by making art happen in real time. By compressing the cycle of rough and final drafts, the Mac provides a more direct route from inspiration to masterpiece.



ELI REED

PHOTOJOURNALIST

Magnum Photos

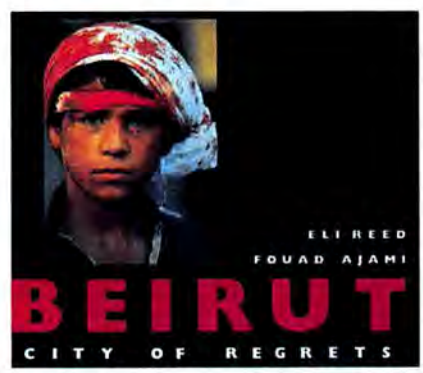
"Computers are sneaking into the newsroom through the back door, just like 35-millimeter photography did."

When it comes to technology, journalists tend to be a conservative bunch. There are still plenty of newsrooms filled with the cacophony of typewriters hammering away, instead of the gentle pitter-patter of word processors. And photojournalists are no exception.

Apple, as one of the sponsors of the *A Day in the Life of . . .* series of photo-essay books, has been making inroads in the photographic community by providing Macs to the teams of photojournalists involved in the projects. One of the photographers featured in *A Day in the Life of Japan* was Eli Reed, who now uses his Mac to help organize the photojournalistic expeditions that take him around the world — to Central America, the Middle East, Europe, and around the U.S.

At Eli's base of operations in New York, the Mac is an integral part of his life, keeping track of his itinerary, equipment, contacts, and notes on the people and places he's capturing on film. His applications are simple — general business software — but the benefits have been enormous. Eli notes that, when the events you're covering are chaotic, it's crucial to have your own information and plans under control.





Eli Reed's latest project (not counting some assignments for *MacUser*) was a book called *Beirut: City of Regrets*, a collection of photos and essays.

ELI REED/MAGNUM



NATASHA LESSNIK

ILLUSTRATOR

SPY

"I create dingbats directly in Illustrator, but I still do them in ink, too. So I can even work in a blackout."

If there was a Pulitzer prize awarded for hyphenated adjectives, *Spy* magazine would be a shoo-in. For the uninitiated, *Spy* is the no-holds barred humor magazine that's rechristened such memorable luminaries as stubby-fingered developer Donald Trump, bosomy dirty-book writer Shirley Lord, and non-Israeli guitarist Roy Clark. Much of the punchy flavor of *Spy* is due to its avant-garde anti-contemporary look. As a start-up magazine on a budget, *Spy* has turned a limited budget for four-color art into an asset, creating a sassy look based largely on typography and black-and-white iconographic illustration. And that's where the Macintosh skills of Meryl Streep-impersonating-free-lance-dingbat-illustrator Natasha Lessnik really come into play.

That's *dingbat,* as in a typographical ornament or symbol. Natasha uses the Mac to create many of the iconographics sprinkled throughout *Spy* as design elements, labels, and in charts. Many of these icons are created in Adobe Illustrator — from scratch or by starting with a scanned sketch.

Spy uses lots of little dingbats for charts like "The *New York Post* in a Nutshell," a graphic that condenses the recurring themes that appear in a month's worth of *Post*s — like Embassy Spy Scandals, Pit Bulls, and Embarrassing Adultery (By Other Than Evangelist) — into a single handy chart. "We used to draw these tiny dingbats and get a bizillion stats made of them. It took hours to strip in these smaller-than-baby-fingernail-sized pieces of repro," says Natasha. She started doing them on the Mac after a set of original drawings inadvertently ended up in the trash. Not only does the Mac protect things from accidental trashification but also Natasha can easily modify the drawings, change the scale, and export them into other programs like PageMaker, where it's easy to construct charts with them.





ELI REED/MAGNUM

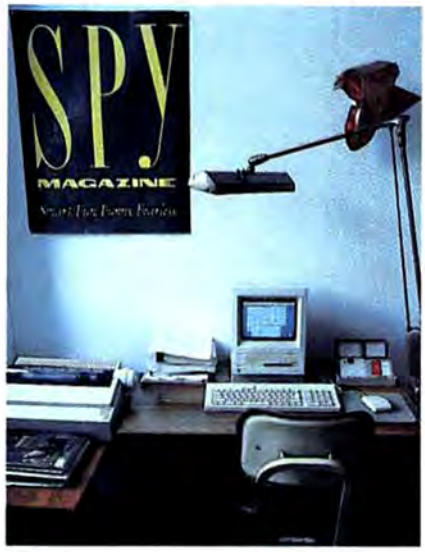
Natasha learned PageMaker in a two-day "trial-by-fire" experience. Later on, she picked up QuarkXPress because she had heard it was better for complex publications. But it still sits unopened under her desk, waiting for the day when she has some time.

You can install a screen-saver on your Mac, but not on your eyes, and scrutinizing the Mac screen can get tiring. Natasha does the next best thing: "I make this horrific background pattern behind the Mac desktop, so I'll remember to look away when I'm not using it."

For final Linotronic output, Natasha has to get the document to a nearby service bureau. Unfortunately, many of these documents run more than 800K, so it's impossible to download them to a disk. The solution: Cut the chart into 800K-sized pieces and manually paste the output together.

All is not high-tech in the magazine business. An old waxer sits next to the Mac equipment on *Spy*'s "Technology Row." The waxer is "good for heat in the winter, but not much else," says Natasha. Another reminder of the persistence of low-tech are the baskets of hard-copy manuscripts produced without the benefit of Macs — but that's changing as the rest of the magazine gets exposed to the Mac.





How much of a sneer should Elvis have? "It's hard to make dingbats that you can 'read' at a small scale, so that the point gets across."



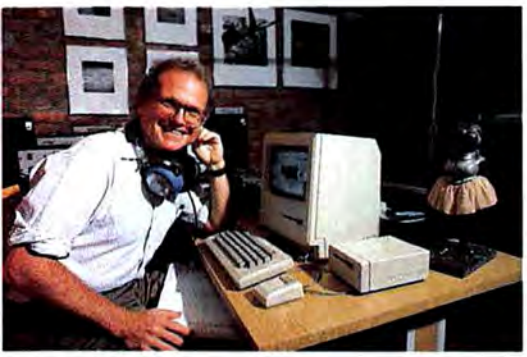




This map of insipid and tasteless American landmarks went through several iterations because "the research department would see it and say, 'No, that's not where Elvis was born — he was born two picas over to the left.' " Revisions are far less aggravating, though, when your cutting and pasting is done electronically.

To create a series of "All-Star Chefs" trading cards, an Illustrator design was converted to FreeHand to add curved type.

Courtesy of SPY Magazine



CHRISTOPHER CERF

MUSICIAN, WRITER, PRODUCER

Children's Television Workshop

"My first exposure to the Mac was at a sneak preview where Steve Jobs asked me if I thought the machine would work without color. I assured him it wouldn't."

If Chris Cerf looks familiar, maybe it's because you've seen his Muppet alter ego, the leader of Chris and the Alphabeats. Or maybe it's because he looks a little like another Muppet — Fozzie Bear. In his human persona, Chris is a composer, writer, producer, and funny guy who's responsible for many of the songs seen on Sesame Street, several of those wicked magazine parodies (like *Off The Wall Street Journal*), and numerous other spoofs.

One of his latest projects is an upcoming prime-time ABC television special loosely based on the best-selling book, *Free To Be . . . A Family* (which Chris edited along with Marlo Thomas). The program will feature a "space bridge" between the U.S. and the Soviet Union — it will also be broadcast on Soviet television — and will include an unprecedented "puppet summit" between Kermit the Frog and a high-level Soviet frog counterpart.

This project, like much of Chris' work, has been a collaborative effort with dozens of contributors — from different countries and even different species. Tracking the status of each author's contributions is a big job, made manageable by the Mac.

Although he has looked at more sophisticated database products, Chris finds that MacWrite, Word, and Excel — along with the Mac's Hierarchical File System — are really all he needs. In Chris' case, it isn't the individual data items that are so complex — it's the multitude of individual pieces. And for that kind of organization, the Mac's own data structure — of files within folders within folders — is his most important software tool. "The *Free to Be* . . . project would have filled three or four file cabinets of paper; on the Mac it's just a little folder."





ELI REED/MAGNUM





Chris also uses the Mac as a creative tool — for writing music, lyrics, and satires. He often roughs out demos of songs in his home studio, creating sequences on his 512K Mac using Mark of the Unicorn's Performer, a Yamaha DX7 synthesizer, and a four-track tape recorder. When it's time to head to a professional production studio to record the final tracks, he has a huge head start. Chris can just play back the sequences on another synthesizer or sampler, instantly giving his rough instrumentations a polished sound — whether it's the sound of orchestral instruments or of an all-animal orchestra.

The Mac also helps him create letterheads, business cards, and other materials for the companies he's formed for different projects — and for some "shell" companies that exist solely in the minds of Chris, a few friends, and a LaserWriter with a sense of humor. "If you want to start a completely fake company," says Chris, "all you need is a LaserWriter and a few typefaces, and suddenly you've got a company like Pentagon Products, Inc." Or The Deep Thought Company of America, co-founded with Douglas Adams; Amalgamated Humanities of Greater New Jersey, Inc., a partnership with frequent-collaborator-and-marshmallow-fluff-heiress Sarah Durkee); or Splotched Animal Music. "I think the LaserWriter was invented for me," Chris acknowledges.

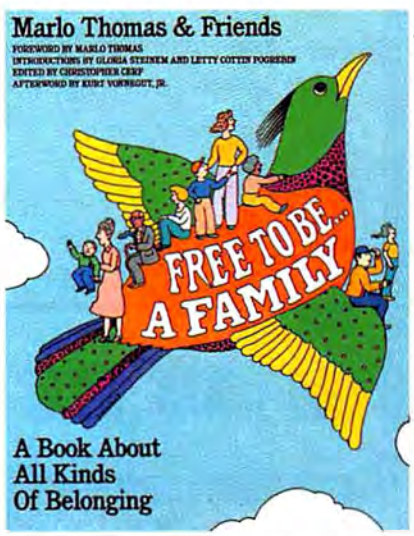
"The main point," says Chris, "is that doing things on the Mac may not always make things easier, but they become more challenging or more fun. I used to hate doing expenses; now I just dislike it. And I can at least play with the form while I'm at it."



Chris has developed many computer peripherals and programs, like the Muppet Learning Keys for the Apple II. Another computer-related project — a TV show on computing conceived with collaborators Alan Kay, Douglas Adams, and Jim Henson — is on hold, so you'll have to wait to find out about the Artificial Stupidity Lab where computers are learning to tell Fozzie Bear–type jokes.



Chris was nominated for a Grammy for the album *Born To Add*. Unfortunately, Michael Jackson was nominated in the same category.



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DAVID SMITH

GRAPHIC DESIGNER

Adobe, Activision, Apple

"I love the constraints of developing icons — one little shift of a pixel can change everything."

When David Smith was an unknown artist in the artistic enclave of Marin County, California, struggling to make ends meet, concerned friends and relatives would ask him if he was making any money yet. So finally he decided the time had come to make some money — big money. Really big money. So he embarked on a series of paintings of enormous dollar bills, several feet in scale.

The image of the dollar bill was one of the first icons from which David drew inspiration. He also created a series of portraits of unreal people, cultural icons like Mr. Potato Head and Gumby. And that has led him, naturally enough, to creating software icons; he's created all of the icons for Adobe's application software (like Illustrator 88) as well as icons and screen design for Focal Point and Business Class, the best-selling HyperCard stacks.

Among Illustrator circles, David is something of an icon himself. Not only did he design the icons for the program, but he conducts seminars on how to use the program, designs promotional posters for Adobe, and is traveling the globe — Japan in particular — as an Illustrator evangelist.

David notes that there are still only a handful of graphic artists in the world that use the Mac as their primary medium. One reason is that matching screen colors and printed colors is still a complex and risky business. In Japan, he notes, color separation is more of a science than an art; he felt confident enough to have a Japanese printer work from an on-screen image created for a piece of promotional artwork he developed for Apple Japan, without ever having seen hard-copy output.

But while color may be more seductive, black and white still offers an endless array of creative options. Before he got hooked on the Mac, David designed logos by hand, which developed his appreciation for the power of mini-

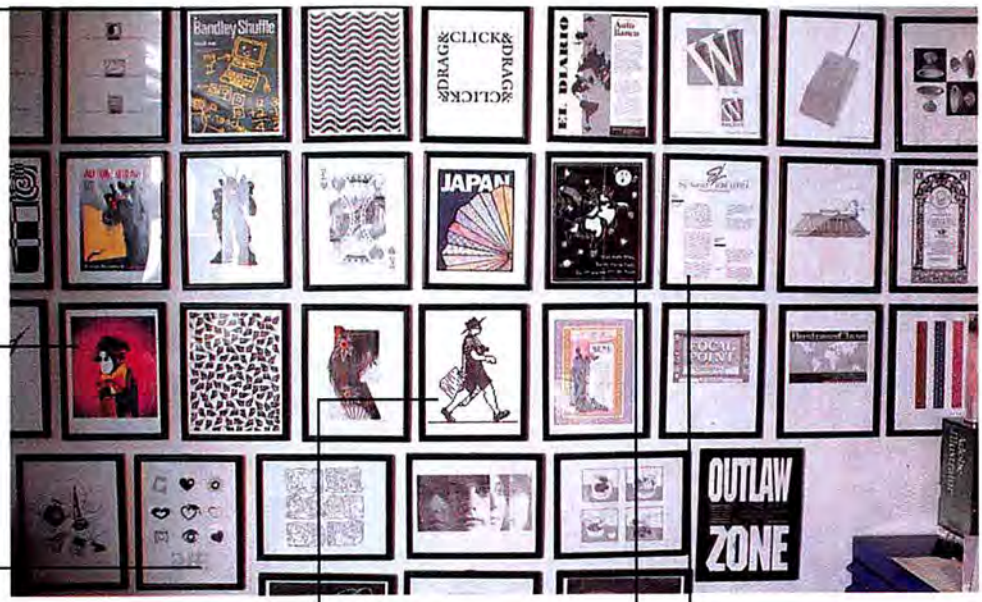




This cover for an in-house Apple magazine was done in MacPaint. "Never underestimate MacPaint and MacDraw," says David. "I play with every piece of Mac software I can — like MacCalligraphy, Mac3D, and MacDraft — but if you're getting what you need from a program, you don't need a new one. What you need is to know what's available."

This geisha was printed on the Tektronix color printer. "The Tek color printer has a brighter, but waxier look. The QMS is more subtle and has PostScript capabilities." It was painted in Pixel Paint. "I'm enamored with Pixel Paint, although I don't get a lot of opportunity to use it," says David. (He got another chance to use Pixel Paint when he produced the artwork on the cover of this issue of *MacUser*.)

A presentation of the concept "ideas under consideration" should ideally give equal weight to all the ideas. The reality of manually produced art is that you have time to do a complete treatment for only one or two of the ideas, with rough sketches for the others. "With Mac illustration, *all* of the rough sketches are of pretty finished quality, instead of playing favorites."



A never-released application by Bill Atkinson retains the "pixelated" look of an icon when it magnifies it to 8½ x 11 inches.

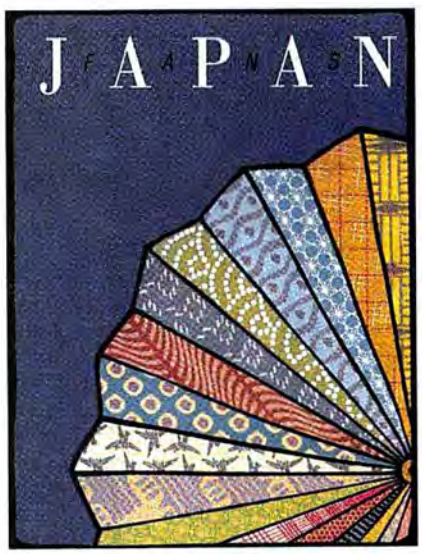
The cow was drawn with a freehand mouse in Illustrator. David adds that "I now know that cows have four, not five, udders."

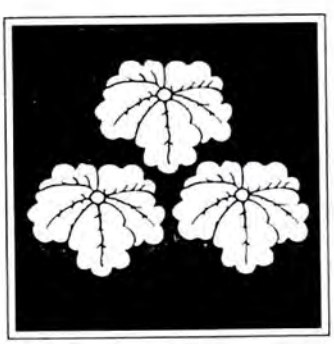
The logo for the *Smart Love* newsletter was done in Illustrator. (It's two people's names, not the sequel to *Safe Sex*).

malistic art. One of the strong points of the Mac is that, after coming up with the right concept, David can immediately generate pages and pages of variations on that logo or icon to fine-tune it, using a few simple commands.

David's wife gave him one of the first 128K Macs as a present, and the rest was history. "It revitalized my life. For 20 years, I hadn't learned anything new — I was recycling old stuff. Now it's helped me redefine my art and transformed my life. I became a Mac evangelist and my wife became a Mac widow."

In fact, says David, "Everybody in Marin has a Mac, ever since it appeared in 'Moonlighting' (even if they never use it)." But he suspects that most of them are being used for business purposes, not artistic ones. "People have been emphasizing the *D* in DTP — desktop — but you can't forget the *P* — publishing. You still need design ability and other skills to create worthwhile content."









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* **Number determined by Macintosh system constraints.**

Demo version of WriteNow included on all Jasmine hard drives.

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THE HELP FOLDER

BY CHRIS ESPINOSA

Got a Mac problem? Something you'd like explained? Something you can't find the answer for anywhere else? Apple's Chris Espinosa will answer your questions every month in this space. When the questions are too tough or too esoteric for him, he'll get the answers from other members of the Mac team. So ask what you need to know and get your answers straight from the source!

Send your questions to Chris care of MacUser, *950 Tower Lane, 18th floor, Foster City, CA 94404. Chris will read all of your questions, but, unfortunately, he may not be able to answer individual queries.*

WITH OR WITHOUT?

Q. I own a Macintosh 512K and am definitely thinking of buying a Mac II (definitely at discount prices — not full retail), so I am gathering the prices. My question: When you buy the Mac II, does the Apple Video Card come with it, or do you have to buy it separately? Another question: If a SIMM is designed for the Mac Plus or SE, is it compatible with the Mac II?

ANONYMOUS
HONOLULU, HI

A. The Mac II comes without a monitor or video card, so you can choose the one you want — Apple's or somebody else's. There are a lot of reasons you might want a different video card and monitor. Some monitors are larger and more expensive (SuperMac's Spectrum, Sigma Design's LaserView, or E-Machines' Big Picture), others are vertically oriented so you can see a whole page at once (Radius), and some special boards blend the Mac II's picture with live video from a VCR or camera (such as Computer Friends' TV-Producer).

What I haven't seen, though, are many monitors or video cards that are the same as Apple's but cheaper. The Classic Professional Graphics Display (check out the July '88 Quick Clicks — it got 3 ½ mice) lists for less than the Apple high-resolution color monitor, but it still requires the Apple card.

SIMMs come in several flavors: The most common are 150 ns and 120 ns. The *ns* stands for nanoseconds and indicates how quickly each RAM chip can look up one bit of information. (A nanosecond is one one-billionth of a second — that's fast!) The Mac II runs faster than the Mac Plus or SE, so it needs the faster (120-ns) chips. And the slower (150-ns) chips that work fine in the Mac Plus and SE are not compatible with the Mac II.

If you happen to find SIMMs with even faster chips (90 or 100 ns), they'll work in any Mac. However, you'll be paying a premium price for speed that will not actually be used. Still, in these days of dire SIMM shortages, any SIMM in a Mac . . .

Many commercial RAM vendors sell only the faster chips, which work in all Macs, but the chips that Apple builds into the Plus and SE can't be popped out and put into a Mac II.

TALK AND POKE

Q. Recently I bought a Jasmine 20-megabyte hard disk for my two-drive Mac SE. The drive came packed with shareware and new System software. Inside the System folder I found a MacinTalk System file. (At the time, I didn't know what it was good for.)

I also had two shareware programs, CheapTalk and Welcome, which I later discovered (much to my amusement) worked just fine with MacinTalk. Then my dealer let me copy for a tryout an application called Poke, which supposedly would alert me in case a "virus" program entered the system.

As soon as I tried to open Poke, an alert box with a three-beep sound came into view to inform me that "the following error has occurred. Fatal error while opening the AppleTalk MPP driver. Error number — 98." Then I tried to open CheapTalk and the following warning box appeared: "MacinTalk driver would not open. The driver must be in the same HFS volume as CheapTalk. It must also be named 'MacinTalk'." So I went back to the System folder to see if there had been any changes and no, there was MacinTalk, as always, with the rest of the files.

Although I don't know if the problems related to these boxes have any connection, they seem to have developed at the same time. Since then I have tried several things to reawaken MacinTalk. I have taken it off the hard disk and recopied it, rebooted the Mac, moved MacinTalk to other folders, and so on, but to no avail. Could you please help my Mac speak again?

EDUARDO BERMUDEZ
HATO REY, PUERTO RICO

A. Well, let's start by clearing up some misconceptions about Poke. It's NOT a virus detector — if you want one of those, try Apple's Virus Rx or CE Software's Vaccine, either of which you can get from a dealer.

Poke is anything but a virus detector. It's a network diagnostic aid, which lets you inject random packets onto an AppleTalk network. (Readers are probably wondering how somebody could make such a mistake. Well,

the Poke icon is a hypodermic needle poking into a network cable, and at first glance it looks like some of the vaccine program icons.)

So when you ran Poke, it looked for the AppleTalk resources (the MPP, or Multiple Protocol Package). Not finding what it was trained to look for, Poke then produced the first set of errors.

Now I don't know exactly what happened next, but it seems that something happened to the driver number assignment of the MacinTalk driver; perhaps your versions of MacinTalk and MPP were using the same driver number. My advice is to back up your fonts and desk accessories, then start up your system from a clean copy of the original disk that Jasmine supplied, trash the System file on the Jasmine, and copy the System file from the start-up disk back into your System folder on the hard disk. Then reinstall the MacinTalk driver from its original disk. (Don't use a copy you made off the hard disk; that one may have been damaged.) And toss Poke. Unless you design or debug network protocols, it's unlikely you'll need it.

Both Poke and MacinTalk are available through APDA. Poke is in the Inside AppleTalk package (order KNSIAT), and MacinTalk is in the MacinTalk Development Package (order KMST3D). Join APDA, 290 S.W. 43rd Street, Renton, WA 98055 for a catalog of these and other goodies.

MACBOTTOM UP

Q. I had been using my 512K with a MacBottom 20 Serial Drive hard disk. I upgraded to a Mac Plus with the new ROMs and 800K internal drive but still use the Serial Drive hard disk. I also had a dealer install a MacSnap 548 2-megabyte memory board.

I reinitialized my MacBottom hard disk and installed the Mac Plus upgrade system. Everything works fine except I cannot figure out how to make my hard disk serve as the start-up disk. And when I am in Finder or MultiFinder, I cannot choose Restart under the Special menu — it is always grayed out.

Can you help me get restarted?

KENNETH D. HARRIS
PLACERVILLE, CA

A. The Mac Plus was the first Mac to be able to handle anything other than the internal and external floppy disks as startup devices, and that ability has expanded through the Mac II to handle NuBus cards as startup devices. But no Mac is able to start up off a serial device without the help of a floppy disk.

Make sure you have the same System software on both the floppy and the hard disk's System folder. Under System software version 5.0 and later, the System folder should have a little Macintosh icon on it. Then, the first time you double-click an application off the hard disk, it'll automatically switch to the software on the hard disk, and you should be able to remove the floppy and operate only on the hard disk. This probably will reenable the Restart item as well.

A macro program like Tempo II will allow you to specify a sequence to be performed automatically on startup (the Finder's Set Startup doesn't work on non-startup volumes, unfortunately). Install Tempo II on your startup floppy and hard disks, and make a startup macro on the floppy to launch some application on the hard disk. That should automate the startup and take some of the pain out of a floppy-disk startup.

APPLES IN ARABIC

Q. My interest was piqued in the June issue of *MacUser* at your response to the question about what is in the SE ROMs. Will programs like FONTastic Plus let me write font sets for Arabic that can be managed by the new Script Manager and used in a word processor like Word? Are there any word processors for languages like Arabic now using the Script Manager in the SE ROMs?

LEONARD LIBRANDE
OTTAWA, ONTARIO

A. I have bad news and good news and bad news. The bad news is that I was wrong; the Script Manager isn't in the ROMs at all. The good news is that it's in the System file and can be used on any Macintosh, even the Macintosh Plus. And you don't have to use FONTastic; Apple makes an Arabic font and System software to match, so most applications can accept and display Arabic text. Now that doesn't mean that applications' menus, dialog boxes, help files, or other on-screen instructions are automatically translated. The application developers still have to translate the text information themselves (or you can, using REdit, but it's tedious.) But at least you can have Arabic text information in documents, such as databases and spreadsheets.

The other bad news is that most word processors don't yet support the Script Manager, so the particular thing you want — an Arabic version of Word — isn't available. And to top it off, Apple sells the special Arabic keyboards only in Arabic-speaking countries.

Arabic System software is available from APDA (order KMSSMA).

FOUR THOUSAND NAMES

Q. I've been reading the many Mac magazines lately in search of a program that will help us keep track of our subscribers, donors, and so on. We have about 4,000 subscribers to our various series and we desperately need some way to keep track of them.

Both of our minicomputers are full, otherwise we'd put these lists on there. Since most people around here are now familiar with the Macintosh, I was hoping that maybe such a program especially geared to performing arts centers existed. Does it?

MARI BERG
URBANA, IL

A. I couldn't find any program specifically geared toward performing arts centers, but a 4,000-name mailing list shouldn't be any problem for many Macintosh applications. And there's quite a price range of programs in

that class: everything from free to $2,000.

If all you want to do is to keep track of 4,000 names and addresses, plenty of inexpensive mailing list programs are available. Mail List from Artworx Software ($19.95) and T-MAN from James River Group ($60) are both special-purpose mailing list programs that'll probably handle your load well. Bulk Mailer Plus from Satori Software can handle up to 90,000 names, and it's compatible with Apple's MultiFinder and works on the Macintosh II; it retails for $350.

If you want something customized for your specific situation (to keep track of who subscribed to what series, separate various levels of donors, etc.), you'll probably need more than a mailing list program. Both HyperCard from Apple (free with a new Mac; $49.95 otherwise) and FileMaker 4 from Nashoba Systems ($295) let you create custom layouts, add your own info other than name and address, and sort and search in interesting ways. HyperCard is faster; FileMaker Plus is better with reports and labels.

If you want to do more sophisticated reporting, you may need a relational database. Relational databases are best when you have several sets of related information — a file for subscribers, a file for donors, a file for performers and crew, a list of donors with how much they gave, and so on — and you want to link all these lists together and perform sophisticated searches and sorts.

Relational databases are probably most like what you have on your full minicomputers. Some to try are Fourth Dimension from Acius ($695), Double Helix II from Odesta ($595), Reflex Plus from Borland ($279), and Omnis III Plus from Blythe Software ($575). All of these give you a graphic Macintosh interface for creating a set of related databases, and all allow varying degrees of speed and customization. Also look at FoxBASE+/Mac from Fox Software and dBASE Mac from Ashton-Tate.

With any of the relational databases, you're getting into a decent amount of money and work, so I'd highly recommend looking the software over in a dealership before you try it. And read the magazine reviews, such as those of Reflex Plus and dBASE Mac in the February '88 issue of *MacUser*.

A REAL BUG

Q. Oh my, oh my, oh my! I have a bug in my Mac Plus. Not a simple virus, or even a pro-

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grammer's glitch, but a real live spider.

The other night I spied a small spider walking along the front of my Mac Plus. Before I got a chance to make it a good (read "dead") spider it ducked into one of the vent slots below the screen. I promptly vacuumed all the vent slots but have no idea whether or not I got it out.

My questions are: (1) What can such an insect do inside a floppy disk drive, which has a tempting (to a spider) slot open all the time? I have been extremely fussy about dust covers but, since they offer no protection from bug-bugs, I now cover the drive slots with masking tape while I am not using them (is there a better way?) (2) Are there any other nasty things a bug-bug can do wandering inside my Mac Plus case? I now use MacChimney; would a fan reduce the attractiveness of my Mac to bug-bugs?

C. P. FERNANDEZ
SAN JOSE, CA

A. Have some feelings! Can you imagine what it must be like for the *spider?* Infernal whirling disk motors spinning over a moonscape of chips and capacitors . . . it crawls up the analog board, over the flyback coil, and across to the CRT, where a sudden arc, like a Star Wars particle beam, zaps it into oblivion. Oh yes, the Mac Plus is far more dangerous to the spider than the other way around.

If it managed to sneak in through the vent slots, it's probably pretty small, and the number of things it can hurt are minimal. The only way I can imagine it can hurt something is for it to crawl onto the disk read/write head right as you insert a floppy disk and get smeared (squeamish readers, you can go now) all over a disk. The only other moving parts in the Mac are the disk loading mechanism and head and spindle motors, and those are much too coarse to be bothered by an arachnid of almost any size that could get in.

A fan might help; it might not; I'm not a spider, and I don't know what they like — except that they seem to favor warm, dark places, and a fan simply makes your Macintosh nicely warm. If you want to really protect yourself, I'd recommend finding that yellow shipping insert that came with your Mac. Remember it? It was ejected from the disk drive the first time you powered on your computer, and your owner's manual recommended that you keep it around. Just pop it in before you put the dust cover on and it'll keep the drive heads safe. It will be ejected when

It Took An Advanced Drawing Program To Create This Art.



you power on the Mac in the morning.

ENGINE WITHOUT THE CAR

Q. I have attempted unsuccessfully for close to a year to figure out how to operate and set up the Tour Engine application found within various Tour disks. I would like, if possible, to create my own tutorial disks or visual displays without depending on a VideoWorks I/II program. In my search I have exhausted all readily accessible information sources. If there is any help available to me, please aid this inquisitive soul.

MIKE HERRON
MANNSVILLE, NY

A. There are a couple of different Tour Engines used. One plays back a sequence of recorded mouse actions, and it's the basis of most of the Apple Guided Tours back to 1984. A development kit for it is available through APDA (see "Talk and Poke," above, for address; order KMSJGT).

But that package doesn't work on the Macintosh SE or Macintosh II; it exploits some quirks of the original Macintosh ROMs and doesn't work well in the newer machines. So Apple uses VideoWorks I and II to make its animated guided tours nowadays. The Tour Engine that's included (the icon is a little movie projector) can't be used to create tours, only to play them back. So you'll have to get VideoWorks to make tours on the Mac SE or II.

THE BACKUP DEBATE

Q. The June '88 issue devoted three articles to the importance of regular backup of a hard disk. On page 13, Frederic Davis states, ". . back up your data onto another hard disk . . . it's the fastest, easiest way." On page 66, Jim Seymour states, "this serious Mac owner . . . backs up the primary internal hard disk to an external hard disk . . . incredibly easy . . . speed and convenience." On page 174, Ben Templin states, ". . . (this) really isn't a viable solution, since a major cause of hard disk crashes is System problems that will probably affect the other hard disk, too."

I always thought disk crashes were caused by some physical calamity like the disk being hit by a baseball bat or some other internal horror story similar to a "Mission Impossible" opening.

Question 1: What is a disk crash? Question 2: If System problems are a major cause of disk crashes, then why would backing up to floppies be viable, since one would be restoring the same

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problems? Question 3: Because a hard disk is relatively inexpensive compared to a tape-backup device, is a second hard disk really the way to go? (In other words: Who above is right, or does Mr. Davis, the Editor-In-Chief, win by default?)

LEONARD ITKIN
BRIARCLIFF MANOR, NY

A. For an individual Mac user at home, an inexpensive second hard disk is a fine way to make "safety" backups — that is, to regularly save all your files for recovery after a hard or soft crash.

A hard crash is when something physically goes wrong with the drive — either physical abuse, or an electronic failure — that prevents the drive from getting information off the disk. A soft crash is when bad information is inadvertently written to the disk, erasing useful information. It's extremely rare for software to cause a hard crash, but buggy software — either System software, application software, or utilities — can mistakenly erase or scramble the disk.

And it's not just bugs that do it; last week I scrambled my own hard disk just by being dumb with FEdit. What's important in this case is to have a recent copy of EVERYTHING, and in the case of a hard crash, another working hard disk. This gets you back up and running.

Of course, if it was bad software that caused a soft crash, you don't want to invite it again. (And I don't happen to agree with Ben Templin — software causes system crashes, which might destroy data, but realio-trulio hard-disk crashes are most often caused by hardware problems.) That's why some people only back up their documents, not their system software or applications — they just keep the original floppy disks for those, and restore these most authentic versions after a crash. That's what I do.

If you work in a group of people or you want to keep more than one hard disk's worth of information (for example, for archival purposes), the backup-on-hard-disk route starts getting costly. That's why people use tapes: A dozen tapes cost much less than a dozen hard disks, and a group of a dozen people can share a tape drive just as they share LaserWriters. And having backups of the files you deleted months ago is really helpful if you're running at the edge of capacity on your hard disk but still want to keep a lot of information around for reference.

So there's your answer — none of them were right, but I am. (Sorry, Fred.)

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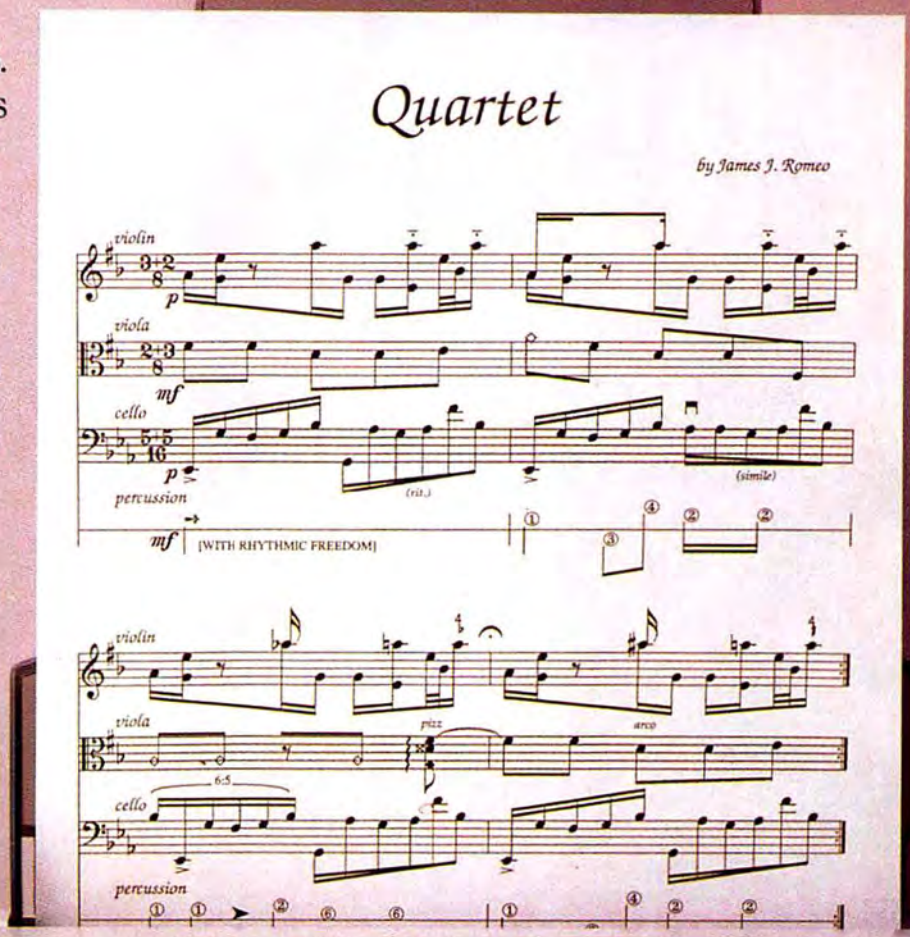
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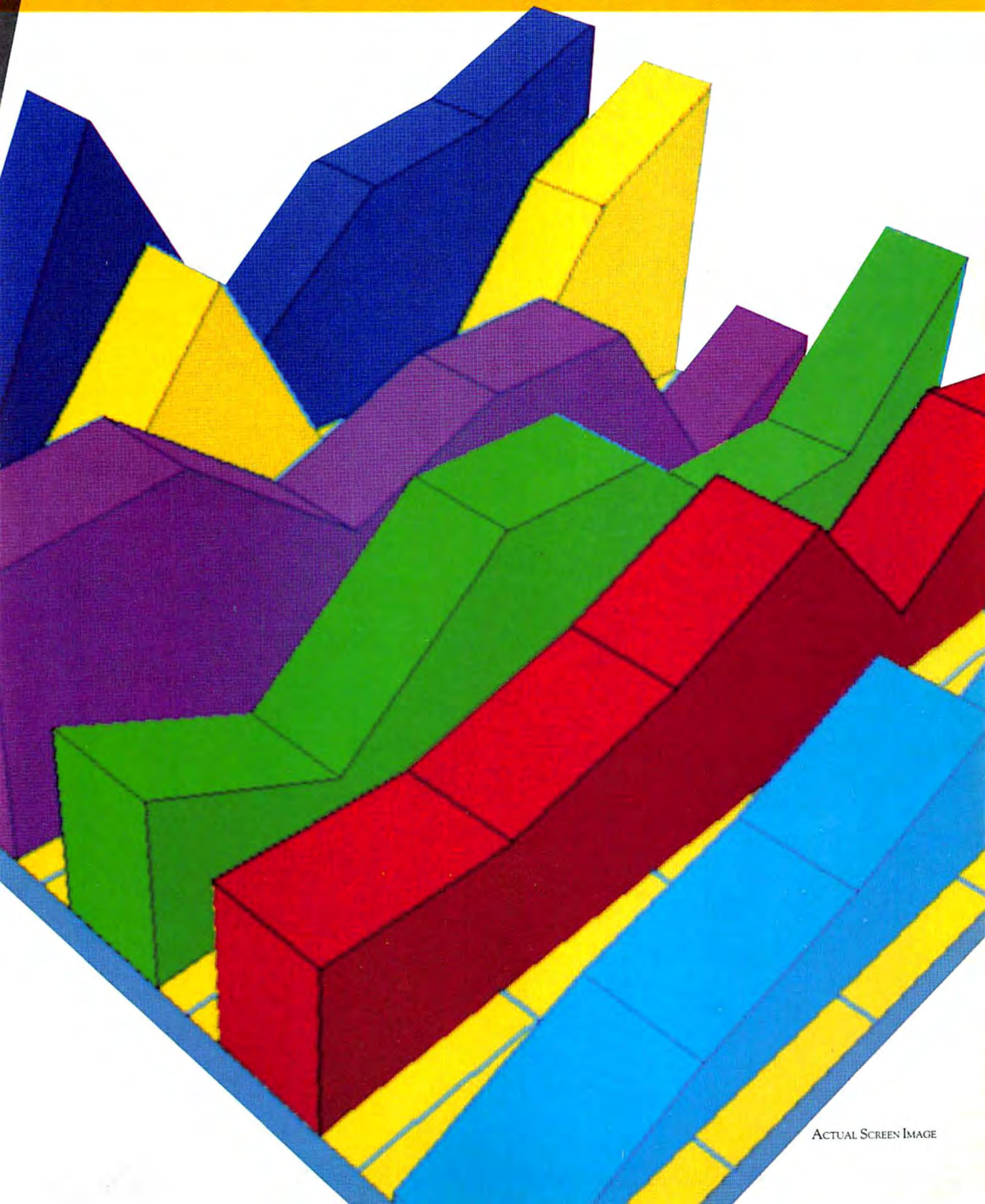
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INFORMIX

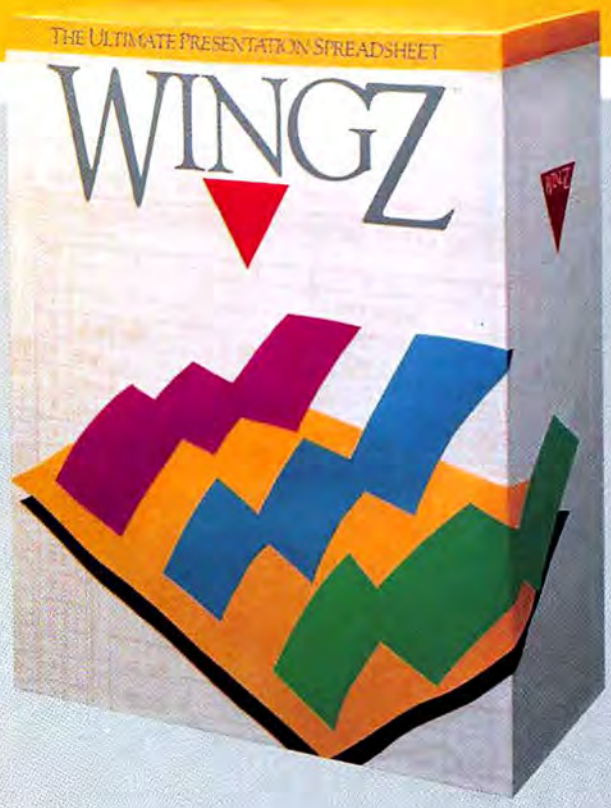
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SPREADSHEET.

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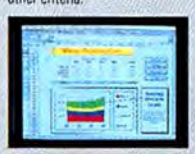
ACTUAL SCREEN IMAGE



INSIDE WINGZ

Spreadsheet

- *Worksheet size:* 32,768 rows by 32,768 columns — over a billion cells.
- *Hierarchical menus:* Certain menu items will bring up a submenu, attached to the original menu.
- *Speed:* Average recalculation for Wingz is estimated at least 30% faster than its closest competitor.
- *Sparse matrix memory management:* Wingz allocates memory only for those cells that contain data, allowing for more efficient memory use.
- *Minimal recalculation:* Wingz recognizes which cells are affected by a worksheet change and recalculates only these cells. This reduces calculation time.
- *Calculation options:* Wingz has automatic, and manual recalculation, as well as natural, row, column, recalculate a range and iterations.
- *Linking:* Through HyperScript users can link together as many Wingz files as their system's memory will allow. Any formula can refer to any cell or any worksheet in memory.
- *Naming Capability:* Identify cells by names rather than cell locations.
- *Fill:* Fill a range with numeric or special text information.
- *Consolidation:* "Paste Special" command copies cells, formulas, values, formats. It also allows you to combine information from two ranges on a single worksheet or from two different worksheets.
- *Insert, Delete, Cut, and Copy:* Applicable for any range of cells. Can paste formulas, formats, values, or any combination.
- *Auditing:* Built-in tools for checking cell relationships and performing other worksheet auditing tasks.
- *Security:* Protect your Wingz worksheets with passwords (read/write and read only) plus data encryption.
- *Annotated Cells:* Add notes to any worksheet. Then hide, view, or print them.
- *Adjustable Rows and Columns:* Rows and columns can both be resized within any Wingz worksheet.
- *Cell Selection:* Wingz allows you to select discontinuous ranges of cells for manipulation.
- *Find:* Search worksheet for specific text, value, formula, or other criteria.



What you see is what you get with Wingz. Presentation graphics, spreadsheet data, and text all on one page.

Built-in functions include:

Business functions:
BONDPRICE, BONDYTM, CINTEREST, CPRINCIPAL, CTERM, DDB, FV, FVL, INTEREST, IRR, NPV, PMT, PRINCIPAL, PV, PVL, RATE, SLN, SYD, TERM.

Database functions:
DMAX, DMIN, DSTD, DSTDEV, DSUM, DSUMSQ, DVAR, DVARIANCE.

Date/Time functions:
ADATE, ADDDAYS, ADDMONTHS, ADDYEARS, CMONTH, CWEEKDAY, DATE, DATE1, DATE2, DATE3, DATEVALUE, DAY, DAYNAME, MONTH, MONTHNAME, NOW, YEAR, ADDHOURS, ADDMINUTES, ADDSECONDS, ATIME, HOURS, MINUTE, SECOND, TIME, TIME1, TIME2, TIMEVALUE.

Logical functions:
ERR, EXACT, FALSE, FILE, ISBLANK, ISCALC, ISNUMBER, ISSTRING, TRUE, ISERR, ISRANGE, ISNA, SIGN.

Numeric functions:
ABS, ACOS, ACOSH, ASIN, ASINH, ATAN, ATANH, ATAN2, COS, COSH, DEGREES, E, EXP, EXPONENTIAL, FACTORIAL, GOAL, INT, LN, LOG2, LOG10, MOD, NORMAL, PI, RADIANS, RAND, ROUND, SIN, SINH, SQRT, TAN, TANH, UNIFORM.

Spreadsheet:
CELL, CELLS, CELLTEXT, CHOOSE, COL, COLS, CTSTRING, CTVALUE, HLOOKUP, INDEX, INDIRECT, MAKEBLOCK, MAKECELL, NA, NFORMAT, ROW, ROWS, VLOOKUP.

Statistical functions:
AVG, COUNT, MAX, MIN, STD, STDEV, SUM, SUMSQ, VAR, VARIANCE.

Text functions:
CHR, CODE, COLLATE, CURRENCY, FIND, LEFT, LEN, LOWER, MATCH, MID, MIDWORD, PROPER, REPEAT, REPLACE, RIGHT, STR, STRING, TRIM, UPPER, VALUE.

User-defined functions:
Create custom functions using HyperScript language.

Hundreds of HyperScript functions:
Hundreds of other functions are available through the Hyperscript language. These functions fall into four basic categories: COLOR, ENVIRONMENT, CONTROL, and MISCELLANEOUS.

Presentation capabilities

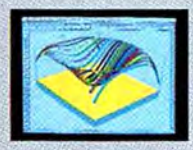
Display Options: Printing graphs, text, numbers, and clip art all on one page. Ability to access as many font types and sizes as the Macintosh system accesses, and use up to 256 colors (Macintosh II hardware limitation, Wingz actually can present over 16 million colors) and/or 38 patterns. Complete control of attributes such as background and foreground colors, fill patterns, object borders, etc. Variable row heights and column widths. Changeable grid color. Turn grids, row and column headers, entry bar, tool box, and worksheet off and on.

Alignment Options: Left, right, center, general.

Number and Date Formats: 14 number and date formats built-in; can create customized formats as well. Negative numbers can appear in red, or any other color you choose.

Text fields: Blocks of text (text fields) can be placed on the worksheet. Editing features include tab, indent, word wrap, search. Change fonts and font attributes down to the individual character. Can reference formulas in a spreadsheet.

Object Orientation: Elements on the worksheet such as charts, free hand drawings, text fields and controls such as HyperScript buttons are considered objects. Objects can be overlapped, covered, removed, resized, and repositioned in any order. Any number of objects can be attached to a sheet.



No Mac software makes it so easy to create such vivid 3-D graphics.

Graphics

Drawing Tools: Capability to design objects with special drawing tools: Straight line, Arc, Circle, Square or Rectangle, and Polygon or Polyline.

Lines and Arrows: Adjustable line widths, 38 different fill patterns, and any combination of colors. Can be resized or repositioned anywhere on worksheet.

Graphic Elements: Graphic images, clip art, photographs, PICT files, etc. imported on the Wingz clipboard can be used.

Charts and Graphs

Chart types: Twenty basic chart types, both scientific and business oriented: 2-D Bar, Line, Layer, Step, Combination, Horizontal bar, Pie, HiLo; 3-D Bar, 3-D Line, 3-D Layer, 3-D Step, 3-D Combination, 3-D Pie, XY, Scatter, Polar, Wireframe, Contour, Surface. Unlimited number of graph types can be created through user modification.

Data smoothing: User controllable.

Unlimited graphs per worksheet: Multiple graphs can be created from either the same data or different sets of data within a Wingz worksheet.

3-D Graphs: Three dimensional graph options. Unlimited permutations of 3-D graphs through graph rotation, elevation, and variable perspective (distance) alterations.

Layout Options: Automatic or manual chart layout options.

Legends: Can be automatically created and labeled.

Axis scaling: Manual or automatic. Linear, loganithmic, or percent scales.

Grid display: User modifiable grid and axis.

Data Points: 32,768 data points per series.

Dynamic Linkage: Automatically redraws charts and makes appropriate changes in text fields when spreadsheet data changes.

Database

Use spreadsheet as a database: Allows for quick and easy organizing, filing, sorting, and retrieving of data in any spreadsheet.

Sort: Can sort on as many as 256 keys.

Operations: Four important database functions are: Find, Extract, Delete, and Sort.

Number of records: Up to 32,767 records. Actual size limited only by memory.

Database selection criteria: Extract or link just the information you need.

Application Programming Language

HyperScript: Complete programming language. English-like. Event-driven. A series of commands can be executed by a single event such as the click of a button.

Programming features: Classic, powerful programming features include IF-THEN-ELSE, CASE statements, DO-WHILE looping, FOR-NEXT-loops, PROCEDURES, etc.

Customization: User-definable menus, advanced controls (buttons, slidebars, and number wheels), dialog boxes, and functions.

Buttons: Automate virtually any action by executing a HyperScript program.

Learn Mode: Allows recording of scripts for replay or edit purposes.

Import/Export Capabilities

Read and write file exchange with other Macintosh and DOS spreadsheet programs, such as Excel (SYLK) or Lotus (WKS, WK1), as well as DIF and ASCII file formats.

Printing

Print Preview: Shows entire page, its layout, and page breaks.

Page features: Headers, footers, titles, margins, automatic page numbering, print formulas or values.

Hide/Show features: Hide or show worksheet information, fixed titles, cell notes, text fields, grid lines, buttons and controls, graphics including lines, squares, etc.

Printers: Supports the range of printers supported by the Apple print drivers, including the LaserWriter, LaserWriter Plus, LaserWriter II, Image Writer II, and Image Writer LQ printers. Wingz also supports a range of additional hardware including color printers which support postscript and Apple Quick Draw Commands.

Color Printing Capability: Requires compatible printer or plotter and driver software.



Wingz can create dramatic engineering graphs that lend visual clarity to complex data.

Other Wingz features

Fully supports Macintosh user interface for increased ease of use.

Utilizes up to 8 MB memory on Macintosh II.

Toolbox for selection of pointing, selecting, creation and drawing tools.

Extensive keyboard interface utilizing Apple Extended keyboard function keys.

Comprehensive, context sensitive, on-line help. Help displayed on screen at same time as active worksheet. Multiple help windows may be open at one time.

Network support. File protection/encryption.

Wingz is not copy-protected.

Hardware and Operating System Requirements

Wingz requires a Macintosh Plus, SE, or II with one megabyte of memory, and two diskette drives or one hard disk. Two megabytes of memory is suggested when running MultiFinder. A hard disk is recommended.

Wingz supports the Macintosh operating system, and will run under System version 4.1 (Finder 5.5) or higher. Wingz also runs under MultiFinder or Apple A/UX.

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MacUser LABS

BY AILEEN ABERNATHY
& THE MACUSER LABS STAFF

MacUser Labs sizes up 25 color monitors for the Mac II and reveals which ones come through with flying colors.

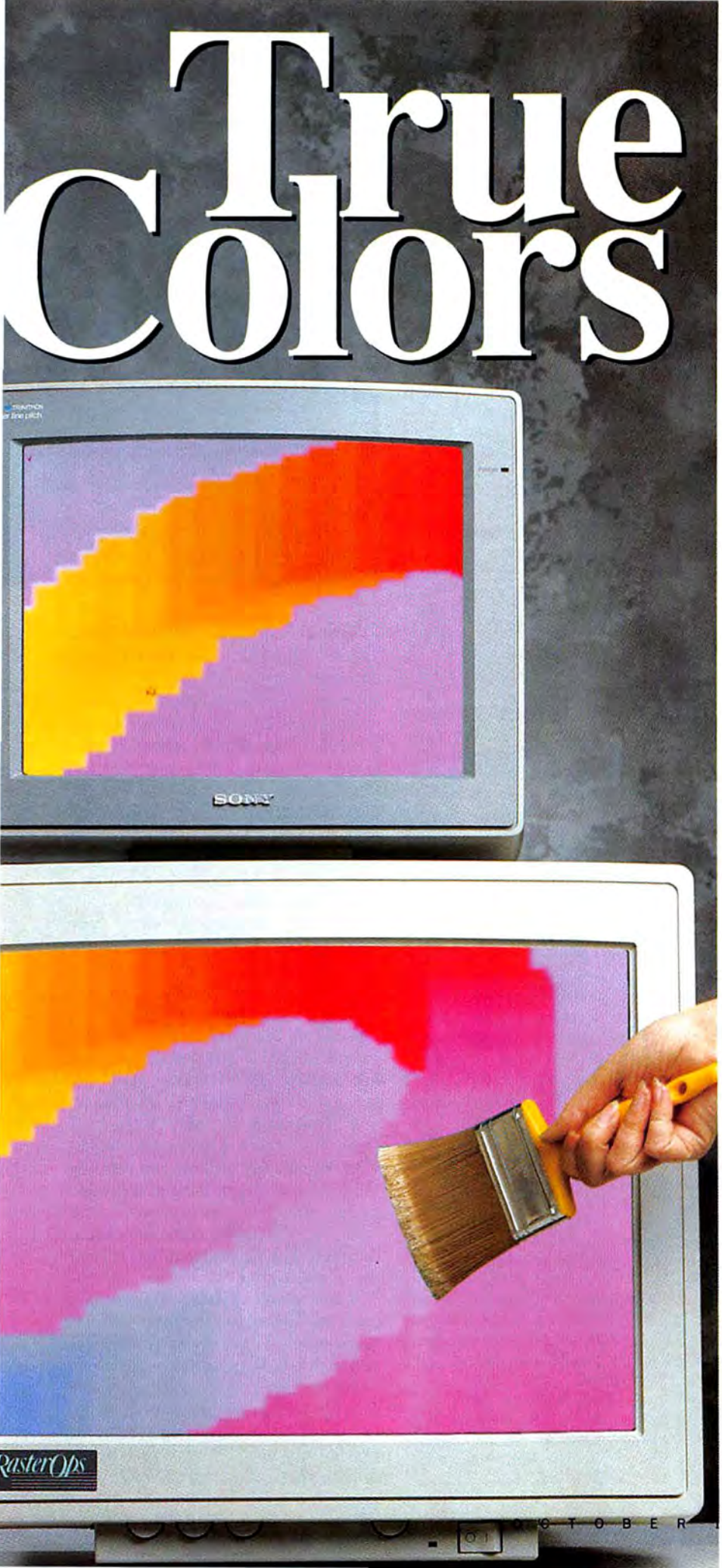


So many colors, so little time. When Apple announced the Macintosh II, with its ability to create an astounding 16.8 million colors, the closet colorists went wild. After years of secretly yearning for purple folders and a chartreuse desktop, they were suddenly faced with an embarrassment of riches. Finally, the Macintosh offered just the right shade to illustrate a red herring, the moody blues, or Soylent green. Engineers and desktop publishers drooled. The white knight who had saved them from Big Blue was finally in Technicolor.

Alas, the monitors to display this multitudinous rainbow were slow in arriving. Apple's own High-Res RGB wasn't available for nearly six months, rendering the new Mac II temporarily color blind. Sony quickly filled the breach with its 1302 Multiscan monitor, and for a while, if you wanted color on the Mac II, Apple and Sony were the only real choices.

Not any longer. Today, color monitors are multiplying like rabbits, with more than 30 available for the Mac II. Your choices range from the 13-inch Classic ($549) to the 19-inch RasterOps Trinitron, an 80-pound gorilla costing $7690 with video card. There are big screens, little screens, screens that shake a lot; sharp screens, fuzzy screens, even screens with missing dots.

True Colors



TESTING, TESTING

For this MacUser Labs report, we looked at 25 color monitors available for the Macintosh II. The monitors were almost evenly divided between standard-size screens (12 to 14 inches diagonally) and the big screens (19 inches), with three 16-inch exceptions. Most monitors were compatible with Apple's 8-bit color video card; a few came with their own video card. (One trendy term is "display system," which is the monitor, video card, and cable.) The RasterOps Trinitron was the only monitor/card combination that offered 24-bit color.

Whenever possible, we compared the monitors using unbiased, objective tests. We developed a battery of tests for measuring sharpness, convergence, gray purity and linearity, and shrinkage — factors that can determine whether a monitor will be a valued asset or an overgrown paperweight. This test suite will be the MacUser Labs standard for testing all future models.

However, some "eyeball appraisals" were unavoidable — and even desirable, since that's how most of us make buying decisions. The relative importance of factors like glare, sharpness, and color quality is really a matter of personal preference. That's why it pays to shop around before you take the plunge. The screen flicker that doesn't faze your co-workers may drive you straight up the wall. Fuzzy text characters may not matter to you, but it may be the make-or-break issue for a writer. In the end, no matter how many scientific studies we do, it really boils down to this: Do ya think it's sexy?

Since computer monitors generate ionizing radiation and thus are a potential health hazard, we hired an X-ray testing service to spot-check several units. We're pleased to report that no stray rays were detected. In fact, the Geiger counter, which is sensitive to extremely low levels of radiation, didn't even click when placed in direct contact with the monitors.

OVER THE RAINBOW

Color monitors are still a novelty for MacManiacs. For years, we had to endure the gibes of our Apple II cousins, whose less powerful machines could do color wheelies around the Mac. A few Mac applications like Cricket Graph supported color printing, but there was no way to display your handiwork on screen.

Color Key

We know what you're thinking: Are there *really* 16.8 million different colors? We haven't worked our way through the entire palette yet, so we'll take the Fifth. But, in theory anyway, you can create an infinite variety of colors by combining various intensities of red, green, and blue light — although the human eye can only distinguish around 1 million colors. Red, green, and blue are called *additive primaries* because, added together, they produce white light.

In contrast, the primary colors of reflected light are magenta, yellow, and cyan. (In grammar school, you probably learned them, erroneously, as red, yellow, and blue.) These are the principal colors of objects — paints, photographs, and walnut trees. They are known as *subtractive primaries* because each absorbs (subtracts) one of the primaries from white light and reflects the others. For example, *minus-blue* paint absorbs blue light, reflecting red and green. Your eyes see this as yellow (strange, but true). Similarly, mixing all three subtractive primaries produces black, because all light is absorbed and none reflected.



The primary colors red, green, and blue can be combined to create any other color in the rainbow — and then some. In this case, 100-percent red, 70-percent green, and 60-percent blue are blended to make a flesh tone.

Color monitors (and television sets) use light to create screen images, producing all colors using only red, green, and blue phosphors. A monitor creates different colors by varying the intensities of its electron guns. If all three guns fire at full (100 percent) intensity, the phosphor glows white. The video board codes all other color as percentages of full intensity. For example, ".3R .9G .4B" means 30-percent red, 90-percent green, and 40-percent blue. Most of us would never recognize this code as light green, however. Likewise, looking at a color won't help us identify its RGB values.

To simplify matters, some graphics programs allow you to specify color using the traditional terms: hue, saturation, and brightness. *Hue* is the wavelength of light, determining whether we see red or yellow, for example. Hues include all the colors of the spectrum (rainbow), plus magentas and purples.

Saturation refers to vividness, or the absence of white in a color. It's the difference between pink and red or between lavender and purple. Also called *chroma*, it is usually described in percent — 100 percent for a fully saturated color and zero for white or gray.

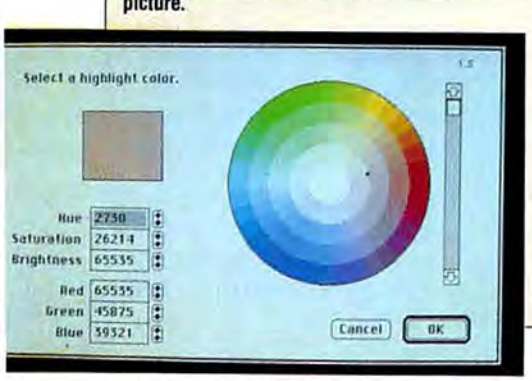
Brightness, sometimes called *value*, is similar to *lightness* (never *whiteness*). It's the difference between light and dark shades of a color, assuming they have the same hue and saturation. The computer stores brightness as a percentage of maximum brightness.

Since 1931, the standard reference for color measurements has been the CIE Chromaticity Diagram. (CIE stands for Commission Internationale de l'Eclairage.) The chart's *x* value shows the amount of red present in a color; the *y* value is the amount of green. Hue and saturation are measured by their position on this chart, which places white and grays in the center and saturated colors along the edges. Brightness is represented by a third axis perpendicular to the other two.

(And yes, Virginia, there really are 16.77 million colors possible with the Mac II, using 24 bits of information per pixel.)

— Aileen Abernathy

The Mac II's Color Picker lets you choose colors in three different ways: from the color wheel by using the mouse; by entering the traditional HSB (hue, saturation, brightness) values; or by specifying RGB (red, green, blue) values. The values shown here were used to create the flesh tone in the above picture.

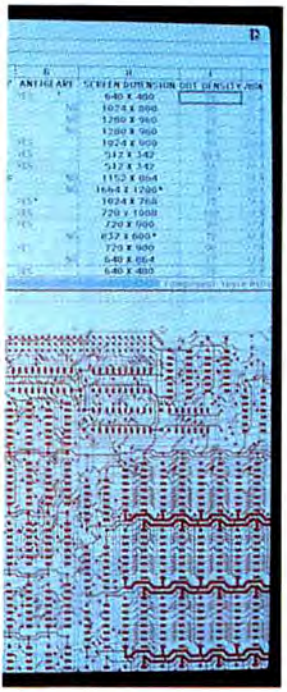




Then the Macintosh II, armed with Color QuickDraw, arrived and changed everything. By plugging in a color video card and monitor, you can display up to 256 colors at once, from a palette of 16.8 million. Mac Plus owners are still out of luck, colorwise, but Orchid's new ColorVue card (see review in this issue's Quick Clicks) allows the SE to display up to 16 colors at a time on an external color monitor. (The Rumor Manager hears that a color SE will debut in 1989.)

Software developers have been working overtime to capitalize on the Mac II's color capabilities. The latest versions of MacDraw, Word, MORE, and PageMaker support color. Excel now allows you to add color to formulas and charts, so you can see your red ink literally. But the real gems are newcomers like PixelPaint, FreeHand, and Illustrator 88 (see "Call It A Draw" elsewhere in this issue). VersaCAD and ReadySetShow are coloring the worlds of engineering and presentation graphics, respectively. And VideoWorks II produces color animation so realistic it practically jumps off the screen.

What about getting high-quality color into and out of the Mac? Be prepared to pay — the products are more than just a tad expensive. A Tektronix 4693D printer will set you back $11,490 for the recommended configuration. That's cheap compared to the QMS ColorScript 100, a PostScript printer that retails for $24,995 (see



Color monitors like the Radius GS/C Display let you colorize everything from complex graphics to spreadsheets and circuit-board designs. Because of limitations in color printing, this picture doesn't fully reproduce the detail, vibrancy, and color you see on-screen.

FROG COURTESY OF SUPERMAC, CIRCUIT DESIGN COURTESY OF DOUGLAS CAD/CAM PROFESSIONAL SYSTEM

"Here's Looking at Hue" elsewhere in this issue). To scan color images, you'll need a color scanner like the Sharp JX-450 ($6,995). The Barneyscan ($8,700) digitizes 35-millimeter slides into a color TIFF file, while Presentation Technologies' Montage ($5,995) lets you produce them.

A QUESTION OF COLOR

We've said it before, and we'll say it again: Select your monitor based on your application. Color costs, and while it looks great, its bells and whistles may not be the best choice for everyone. Sure, color adds more information. Color-coding your files and folders, for example, adds another level of organization to the desktop. For some folks, though, color may be just a toy, useful mainly for distinguishing the good guys from the bad in Crystal Quest.

If you spend most of your time working with text, think twice before investing in a color monitor. Text characters will be slightly fuzzy on even the best color monitors (although Trinitrons do quite well in this area), because of unavoidable convergence mismatches among the three electron beams used to create the images. Thus, monochrome or gray-scale monitors still offer the sharpest pictures.

Speed is another consideration. The 1-bit video of monochrome monitors will always be faster on the draw than the more than 8 bits used for color monitors. Up to eight times faster, in

Color QuickDraw: A Matter of Depth



Once upon a time, Macintosh display architecture was simple and uncomplicated. Screens were 342 x 512 pixels, in black and white only. Then the Mac II came along with Color QuickDraw. Screens have become not only taller and wider but also deeper. This third dimension is not something you can measure with a ruler, but it has a dramatic impact on the realism of a color image.

Depth refers to the number of different colors that can be used for any pixel on the screen. For the Macintosh, this number is based on a binary representation. For example, an ordinary monochrome screen requires one binary digit (1 bit) to represent two colors, black and white. On the other hand, 8-bit color video has 8 bits of information associated with each pixel. These 8 bits give you 2 to the power of 8, or 256, choices of color at one time.

In the Color QuickDraw implementation currently provided with the Mac II, each pixel contains a binary value that is 1, 2, 4, or 8 bits deep. This value does not directly indicate the color but is used instead as an index to the Color LookUp Table (CLUT). For example, if a binary value of 9 represents olive green, then the PixMap would look up color information for a pixel with that value from the ninth position in the CLUT. (The PixMap is the RAM version of the screen image.)

The CLUT describes each color with 48 bits, 16 bits each for the red, green, and blue (RGB) components — although most existing hardware and software use only 8 bits for each component. Each color on the screen must be stored as an indexed value in the CLUT. With an 8-bit video card, only 256 different colors can be stored (and displayed) at one time. Thus, the CLUT is actually a subset of the 16.77 million colors possible with Color QuickDraw. Certain utilities, such as Kolor and Klutz, let you change the CLUT's color contents.

Apple and third parties are extending Color QuickDraw to provide direct (or "true") color specification. Each pixel will have its own RGB components, eliminating the need for a CLUT limited to 256 color choices. This scheme uses three 8-bit components for a total of 24 bits, or 2 to the power of 24 (16.77 million) color choices for each pixel on the screen.

Two distinct and largely incompatible implementations of direct color have been proposed. The first, *chunky/planar*, is already being used in RasterOps video boards. It handles each 24-bit PixMap as three 8-bit PixMaps. Its main advantage is that it can be implemented by third parties without a major rewrite to the Mac II ROM.

However, Apple has announced it will be providing *fully chunky* color, in which each 24-bit value is stored within a contiguous 32 bits. Its main advantage is speed of drawing, although the extra 8 bits will be wasted in many cases. Once this update is released in ROM patches with System 7.0, it will be available to all Mac II owners.

Direct color promises to be a key part of the Mac II market, once the specifications are nailed down and third-party hardware and software are available to support the new capabilities.

— Joel West



The graininess of this picture is typical of an 8-bit color video card. The screen can display only 256 colors at once, which is not enough to show all the minute color variations present in a photograph.



Baby Elizabeth looks much better in 24-bit color. This picture, generated from the same TIFF file as the 8-bit version, is displayed with RasterOps' 24-bit color card. Because RasterOps uses 8 bits each for red, green, and blue, you can display 16.8 million colors on-screen at the same time.

fact, on similarly sized screens. System 6.0 partially addresses this problem with Quickergraf, a built-in patch to QuickDraw that significantly increases the speed of color graphics. Quickergraf is also available as a separate INIT file that works with System 4.2 (check CompuServe or other online services).

So who needs color, anyway? Engineers, for starters. Intricate mechanical designs and multilayered circuitry patterns quickly degenerate into meaningless scribbles when rendered in black and white. Presentation graphics also cry out for color. Architecture, medical diagnostics, and many other fields rely on color for information and clarity. The case for desktop publishing is not as clear cut, since quality color printing is still a pricey and problematic proposition. Finally, artists are exploiting the Mac's color potential, both for computer art and applications such as textile pattern design.

RESOLUTIONARY THINKING

Your most important consideration in choosing a color monitor after price (more on that later) should be resolution. Resolution is simply the total number of pixels (picture elements) you can see on-screen at one time. It affects usability more than any other factor, since it determines how much information the monitor can display.

A monitor's vertical resolution is given in lines, and its horizontal resolution, in pixels per line. Apple's High-Res RGB monitor has 480 lines of 640 pixels per line (normally listed as 640 x 480). On a 9-inch screen, that's 72 pixels per inch (ppi). Most of the monitors reviewed here fall into this category. So-called *high-resolution monitors* have pixel counts greater than 1000 x 800. The Radius GS/C, for example, has a resolution of 1,152 pixels per line across a 19-inch screen, yielding 82 ppi.

When should you opt for high resolution? If you'd like to see more of your painting or 130 columns on your spreadsheet, then a high-resolution monitor may be for you. CAD/CAM applications are also good candidates; increased resolution means you can see

How It Works

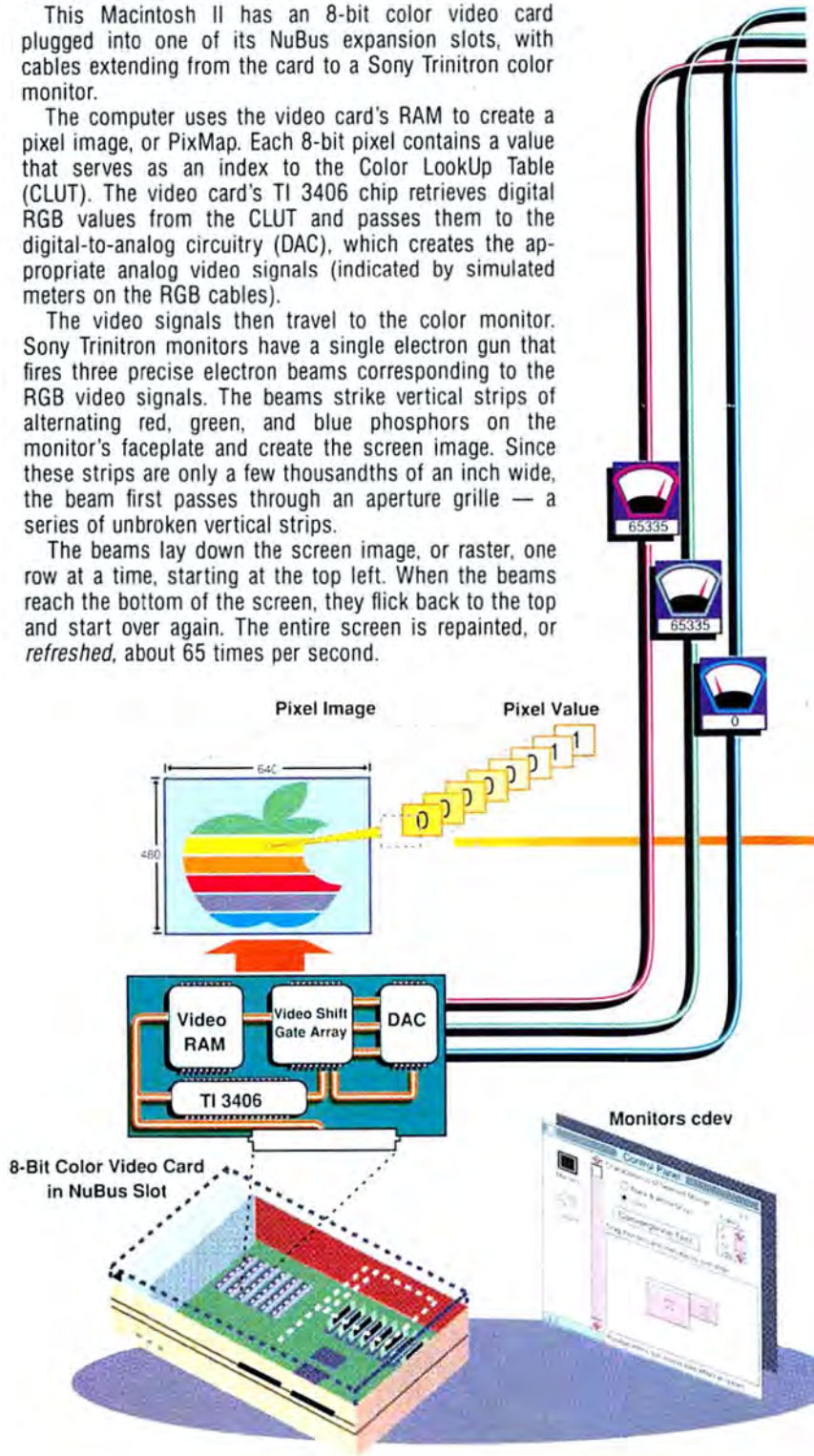
VIDEO BASICS

This Macintosh II has an 8-bit color video card plugged into one of its NuBus expansion slots, with cables extending from the card to a Sony Trinitron color monitor.

The computer uses the video card's RAM to create a pixel image, or PixMap. Each 8-bit pixel contains a value that serves as an index to the Color LookUp Table (CLUT). The video card's TI 3406 chip retrieves digital RGB values from the CLUT and passes them to the digital-to-analog circuitry (DAC), which creates the appropriate analog video signals (indicated by simulated meters on the RGB cables).

The video signals then travel to the color monitor. Sony Trinitron monitors have a single electron gun that fires three precise electron beams corresponding to the RGB video signals. The beams strike vertical strips of alternating red, green, and blue phosphors on the monitor's faceplate and create the screen image. Since these strips are only a few thousandths of an inch wide, the beam first passes through an aperture grille — a series of unbroken vertical strips.

The beams lay down the screen image, or raster, one row at a time, starting at the top left. When the beams reach the bottom of the screen, they flick back to the top and start over again. The entire screen is repainted, or *refreshed,* about 65 times per second.



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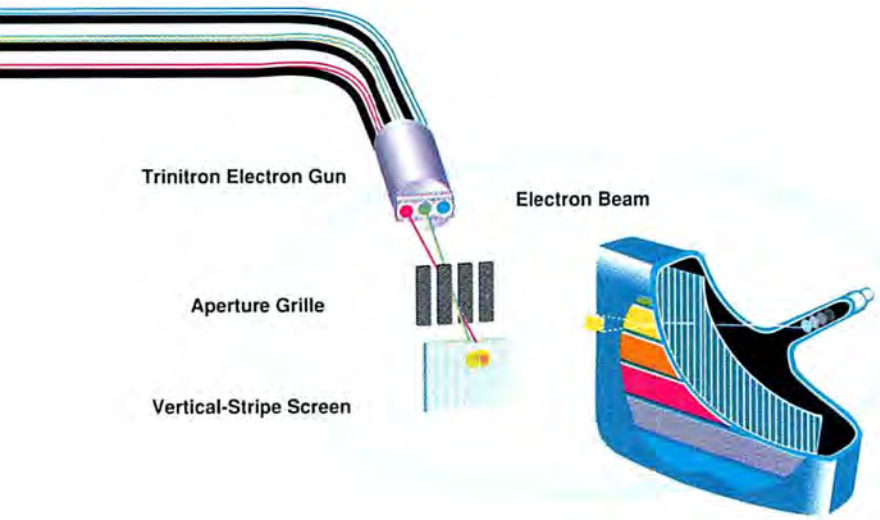
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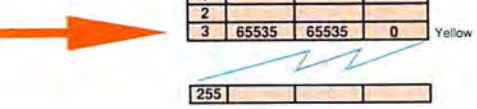
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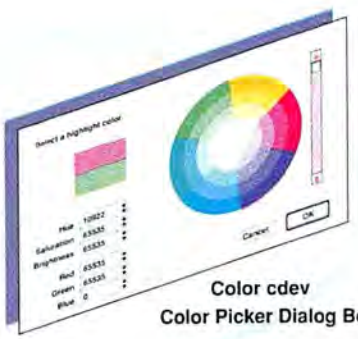




Index	Red	Green	Blue
0			
1			
2			
3	65535	65535	0
255			

Yellow

Color LookUp Table



Color cdev
Color Picker Dialog Box

CHANGING COLORS

The Mac's System software includes two Control Panel devices (cdevs) — Monitors and Color — that let you adjust the color of your monitor.

The Monitors cdev (left) lets you select the number of grays or colors, which depends on the video card's memory capacity. Monochrome monitors need only 1 bit of memory for each pixel on the screen. Color requires more bits per pixel to keep track of the red, green, and blue components of each color. The more memory a video card has, the more colors you can display on the monitor at the same time. Apple's 4-bit video card provides a maximum of 16 (2 to the power of 4) colors, while an 8-bit card provides up to 256 (2 to the power of 8) colors. The Mac II theoretically can support the definition of as many as 281 trillion (2 to the power of 48) colors. The actual colors used for an application will be a subset of the possible colors.

The Color cdev (above) enables you to modify one value in the Mac's default CLUT, the one that governs the screen's highlight color. The rest of the CLUT remains the same unless it's changed by loading a new table or changing the existing one. Many color paint programs allow you to change the CLUT. The shareware program Klutz allows you to see and change the CLUT's full palette of colors.

more of a circuit board design, for instance. Bear in mind that high resolution doesn't necessarily mean improved sharpness, especially for text. (See sidebar "Pixel Perfect.")

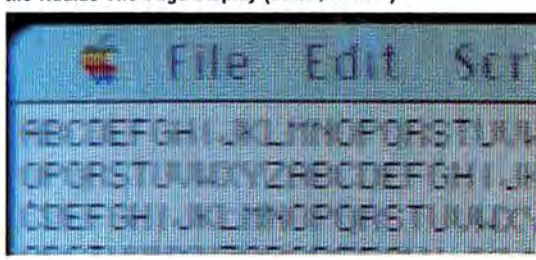
Bigger screens usually have higher resolution but not always. The Microvitec Definition monitor using the Apple video card has exactly the same number of pixels per line as Apple's High-Res RGB monitor. But the Microvitec displays them across a 19-inch screen, yielding only 43 ppi. Thus, although it has a magnified picture, the Microvitec has the same resolution as the Apple monitor and, consequently, displays exactly the same amount of information. Note that the two monitors have identical resolutions but different ppi values; ppi is only useful in comparing resolutions when screen sizes are the same.

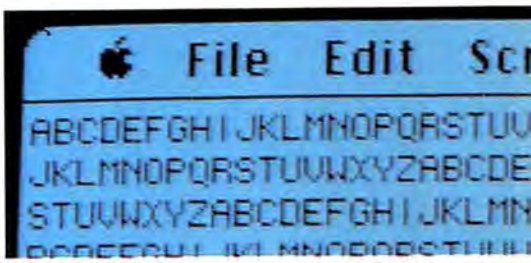
Keep in mind that the Mac's WYSIWYG relationship with PostScript printers works only for monitors with a resolution of 72 ppi (sometimes called dots per inch, or dpi). A lower ppi will produce bigger on-screen images (sort of like blowing up a photograph), but the printout will still be 72 dpi. Likewise, monitors with higher ppi produce smaller, tighter screen images that aren't accurately represented on paper.

CHROMA CHAMELEONS

If you want to use your monitor with computers besides the Mac, you should buy a multiscanning monitor. *Multiscanning* means the monitor can

Trinitron monitors such as E-Machines' T16 can display relatively sharp text in color (below, top), but they can't compete with the crisp letters produced by monochrome monitors like the Radius Two-Page Display (below, bottom).





vary its scan, or frequency rate. The *horizontal scan rate* tells how fast the electron guns lay down individual lines on the phosphor-coated screen (in kilohertz, or thousands of cycles per second); the *vertical scan rate*, or *refresh rate* reflects how quickly entire screens are drawn (in hertz). Monitors are normally preset to operate at only one horizontal and vertical scan rate and therefore will only work with video cards that use those rates. But multiscan (or multisync) monitors can synchronize their circuitry with a variety of scan rates. This offers greater flexibility, since a multiscan monitor can be used with any video card that "fits" its horizontal and vertical scan rates.

The Taxan Ultra Vision 1000, for example, is a multiscan monitor that can run on either the Apple or Radius video cards, which have different scan rates. Apple's High-Res RGB can't be paired with the Radius card, however, because the monitor's fixed scan (frequency) rates are too low.

The main drawback of multiscan monitors is that they are adjusted to fit an average of video inputs and thus may not work perfectly with all cards. Of course, this "average" is today's standard, IBM. Some multiscan monitors we tested, like the NEC models, were not designed to operate with the Apple card and consequently produce images that are too small. Another disadvantage of multiscan monitors is their plethora of controls, all of which must be adjusted before you get the image you want. Fixed-frequency monitors, on the other hand, are usually preadjusted.

Shades of Gray

If you need more moxie than a monochrome monitor offers but gulp at the price of a color setup, take a look at gray-scale monitors. These monitors, to be covered in a future Labs Report, produce up to 256 shades of true gray (as opposed to dithered patterns of black and white dots that merely imitate gray).

The fundamental difference between gray-scale and color monitors is their beam arrangement. Gray-scale monitors produce screen images using a single electron beam of varying intensity. The harder the beam hits the phosphor, the whiter the phosphor dot glows. In contrast, color monitors mix three beams together to get a single color. Even in monochrome mode, a color monitor must blend the three beams to get black and white. This requires greater precision in focusing and convergence; thus, gray-scale monitors generally provide sharper images than color monitors.

Gray-scale monitors are excellent choices for desktop publishing and many graphics applications, especially those using scanned images or photographs. If you don't really need color, it can be a waste of money. An excellent gray-scale monitor and card can be purchased for under $1,100, slightly less than a mediocre color system of similar size. — *Andrew Eisner*

STICKER SHOCK

If you want a clear, sharp picture with excellent color, be prepared to pay for it. The top of the line — in price, resolution, and quality — are the 16- and 19-inch monitors that use Trinitron tubes (made by Sony). E-Machines, RasterOps, and other companies sell Trinitron display systems for prices ranging from $3,300 to more than $7,000. Next are the 19-inch multiscanning monitors like the Taxan and Electrohome models, which have sticker prices of $2,900 or more just for the monitor. The Apple and Sony 1302 monitors are in a class by themselves, offering high-quality Trinitron pictures on 13-inch screens. They retail for about $1,700 with the Apple card. Finally, there are 12- to 14-inch monitors like the Relisys and Magnavox, which run on the Apple card and have price tags of $700 and up.

The monitors' warranties range from Apple's 90 days to Magnavox's two years for parts and labor. Bear this in mind; color monitors and video cards are almost as expensive to repair as they are to buy. Some companies offer toll-free support, which can be extremely helpful if you mail-ordered your monitor.

If you're buying a multiscanning monitor, be forewarned that they all come with PC cables by default. Be sure to tell your dealer or mail-order house that you need a Mac II cable (you'll have to pay extra for it). The general rule is: If the monitor doesn't come bundled with a video card for the Mac II, or the cable isn't permanently attached, you must specifically ask for it, even if it's free.

When your monitor arrives, installation is a snap, thanks to the flexibility of the Mac's NuBus expansion slots and system software. All you do is insert the video card, attach the cable, and turn it on. Go to the Control Panel, click the Monitors icon, and select 256 colors. It's that simple!

PHYSICAL FITNESS

Color monitors are generally bulkier than monochrome models because of the color CRT's increased depth. Their footprints range from a petite 178 square inches for the 12-inch screen to a truly massive 403 square inches for a 19-inch monitor. We especially liked the 16-inch monitors' economical use of space. They provide a nice screen size without taking up so much real estate. Their footprint is 288 square inches, only 56 square inches more than the largest 13-inch monitor. If you really require a huge screen, keep in mind the extra space needed to house them.

Tilt/swivel stands can help fine-tune the screen angle to reduce glare and achieve a comfortable viewing level. Most monitors we tested come with a tilt/swivel stand; the rest offer it as an option. We recommend getting one if you aren't already equipped. Small monitors benefit from the added height provided by a tilt/swivel stand, while the 19-inch behemoths gain improved maneuverability. One company, Ergotron, makes tilt/swivel stands to fit several popular monitor sizes.

CONTROLLING FACTORS

A color monitor shouldn't require frequent adjustment, although it might need an initial tweaking of vertical and horizontal size and centering. Unfortunately, some don't have all the controls you need to adjust them properly. The Classic monitor, for example, doesn't have any horizontal or vertical size controls, so we couldn't make the screen image as large as it should have been. Multiscan monitors may need occasional readjustments, so their controls should be readily accessible. Some monitor makers hide them in the back — perhaps to maintain

Pixel Perfect

Without a doubt, sharpness is the most complicated, confusing, and difficult-to-measure quality of color monitors. It's related to resolution, but not directly. More pixels (picture elements) can improve sharpness, but high-resolution monitors with fuzzy pixels don't look too sharp. A higher resolution photograph can look sharper, for example, because more small features can be seen in the picture. But in general, as more pixels are crammed into a line, the sharpness of each pixel decreases.

Sharpness is also affected by the number of colored phosphor dots on the screen. Contrary to popular belief, one color dot does not necessarily equal one pixel. Some monitors have pixels composed of more than one color dot (actually a triad of red, green, and blue dots). These monitors generally have sharper images than those with only one dot per pixel. Why is this? Because a 1:1 dot-to-pixel ratio demands a more precise electron beam, and some color monitors aren't up to the challenge, resulting in smeared pixels and a fuzzy picture, as well as moiré (irregularity of appearance) problems. This precision is at least one reason high-resolution monitors are so expensive. In this report, we use pixels per inch (ppi) instead of dots per inch (dpi) to refer to resolution, to avoid confusion with color dots.

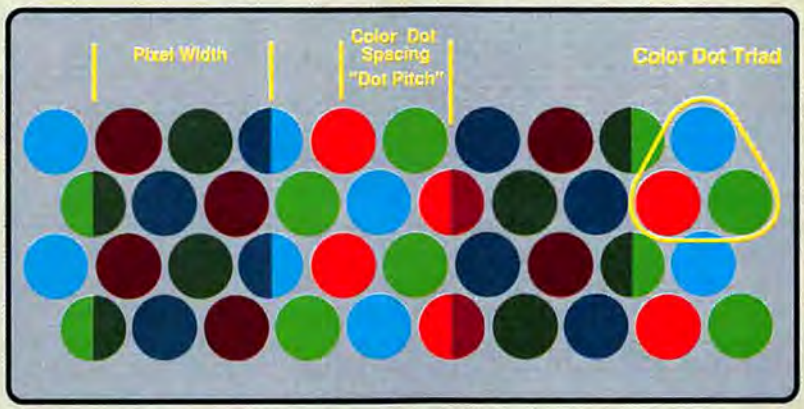
In the monitors we tested, the ratio of color dots to pixels ranged from the 1:1 of the Radius GS/C to the 2:1 of the Microvitec Definition. We salute the engineers of the Radius monitor, one of our top-ranked machines, for managing to combine a high pixel resolution and surprising sharpness.

Color-dot spacing, or *dot pitch,* refers to the distance between like-colored phosphor dots (or adjacent color stripes in Trinitrons). In general, a smaller dot pitch produces a sharper image. The monitors we tested had dot pitches ranging from 0.25 millimeter to 0.31 millimeter — a small difference, true, but enough to affect sharpness when pixels are packed close together.

A monitor can have a high ratio of color dots to pixels and a small dot pitch and still fail the sharpness test. The culprit is usually misaligned beams (misconvergence), poor focus, or low bandwidth. A poorly focused beam may be too wide, and will result in fuzziness because pixels are smeared together. Or it can be too narrow, creating black spaces between the raster lines that are just as annoying as fuzziness. Ideally, pixels should just touch one another to give a solid, sharp image.

The video bandwidth indicates how quickly the electron beams can be switched on and off. A high-resolution monitor, which scans extremely quickly, must have a high bandwidth in order to prevent horizontal blurring of pixels. The monitors in this report had bandwidths ranging from 17 to 200 megahertz. Within each size category, the monitors with the lowest bandwidths generally suffered in the objective sharpness test.

—Aileen Abernathy



Pixels per inch* and *dots per inch* don't always mean the same thing, so choose your terms carefully when comparing resolutions. In this example, the dot-to-pixel ratio is 1.5:1. That is, every pixel has a width of one and a half color-dot triads. The distance between two phosphor dots of the same color is the *dot pitch.

that sleek, uncluttered look. Poor placement of controls is especially bothersome with large monitors. You almost have to be a contortionist (or use a mirror) to make the adjustments and see the screen at the same time.

Unlike monochrome monitors, most color units don't come with software. E-Machines, Radius, and RasterOps were the exceptions, providing cdevs. E-Machines' cdev allows you to adjust contrast and brightness and provides a screen saver. The Radius cdev's features include tear-off menus, while the one from RasterOps allows you to switch between 8- and 24-bit color.

A bright screen image can help combat glare, so make sure your monitor has a brightness range adequate to your needs. Keep in mind that brighter images may not be as sharp. Increasing the intensity of the electron beams makes them wider, and they can bleed into adjacent pixels.

Also check the monitor's contrast — the relative difference between the screen's dark and light areas. Displays with poor contrast ratios will look muddy or washed out, and similar shades of color may blend together or disappear in bright light. Contrast is also important for readability; poor contrast between text and background can quickly cause eye fatigue.

Another handy control is the degausser, which removes the screen distortions caused by nearby magnetic fields. Color monitors are extremely sensitive to magnetic fields, which magnetize any metal near the screen, such as the shadow mask or aperture grille. This creates some interesting screen effects in both color and linearity. Be careful not to put your telephone receiver or magnetic paper clip holder too near the screen; even these tiny magnetic fields can create havoc. The degausser demagnetizes the monitor, restoring things to normal. (On the flip side, we wonder whether placing a degausser right over a hard disk is

really such a good idea.)

If your monitor doesn't have a degausser, keep an electric pencil sharpener handy. In a tight situation, it's been known to do a fair job of degaussing. With the sharpener running, hold it close to the screen and slowly rotate it as you move it away.

HOW GLARE YOU

Because color screens are not as bright as monochrome screens, glare resistance should be a prime consideration in your choice of a monitor. Screens without glare protection offer the sharpest, truest color, but their polished-glass surfaces resemble mirrors, reflecting even the slightest hint of ambient light. While you're admiring your reflection, whole color families are consigned to oblivion. Monitor makers overcome this problem by using anti-glare surfaces that let you see subtle shades of color even in bright light.

As always, there are trade-offs. Coatings from Optical Coating Labs Incorporated (OCLI) provide the best glare resistance, but they are expensive and show fingerprints with amazing clarity. The most common anti-glare treatment — etching — blurs the screen image slightly. The least effective solution is darkened glass, which merely deepens the background black of the screen. (For more information on glare treatments, see MacUser Labs Report, August '88 .)

All the monitors we tested had some form of glare protection. To judge the relative merits, we looked at the screens from various angles in a room with subdued lighting. As expected, the six monitors with OCLI coatings had the best glare resistance. Next came those with etched screens, usually in tandem with darkened glass. The lowest scores went to screens like that of the Apple High-Res RGB, which had a highly polished — albeit darkened — glass surface that didn't provide adequate glare shielding.

GHOST WRITING

On a monochrome monitor, "ghosting" is an afterimage that remains onscreen even though the original image has disappeared. Color monitors, on the other hand, display ghosting as a faint double image, similar to a television set with poor reception. It's usually caused by cabling problems. We also checked for related problems like "striping," faint horizontal shadows that continue beyond actual lines of text or windows. Some inexpensive monitors also show faint vertical stripes on the left side of the screen.

FLICKER FLACK

Flicker is a faint pulsing of the screen image, usually more apparent out of the corner of your eye. You may walk into a computer store, stand six feet from a flickering monitor, and be dazzled by its gorgeous colors and impressive graphics. After sitting in front of it for eight hours, though, you may be more inclined to put the monitor out of its (and your) misery.

Flicker can occur when a low refresh rate (below 65 hertz) is combined with a short-lived screen phosphor. Successive screens don't blend together completely, and your eyes see each screen being replaced by the next — over and over and over again. Large monitors are especially susceptible to this nuisance. Generally, a vertical scan rate of 65 hertz (a redraw rate of 65 times per second) is enough to eliminate flicker on large screens.

THAT'S A MOIRÉ

Another minor annoyance common to color monitors is *moiré,* a faint, marbled pattern resembling oil on water. These wavy patterns, usually visible only in patterns of thin lines or dithered backgrounds, result from a low ratio of phosphor dots to pixels. We checked for moiré by looking at dithered white and black dots. The Radius GS/C fared worst, displaying a moiré pattern of alternating pink and green stripes.

(Dithering is the creation of an illusory color or shade of gray using a pattern of dots. It allows you to create colors that don't really exist, such as grays on a monochrome monitor. Dithering can be as simple as the alternating black and white pixels that

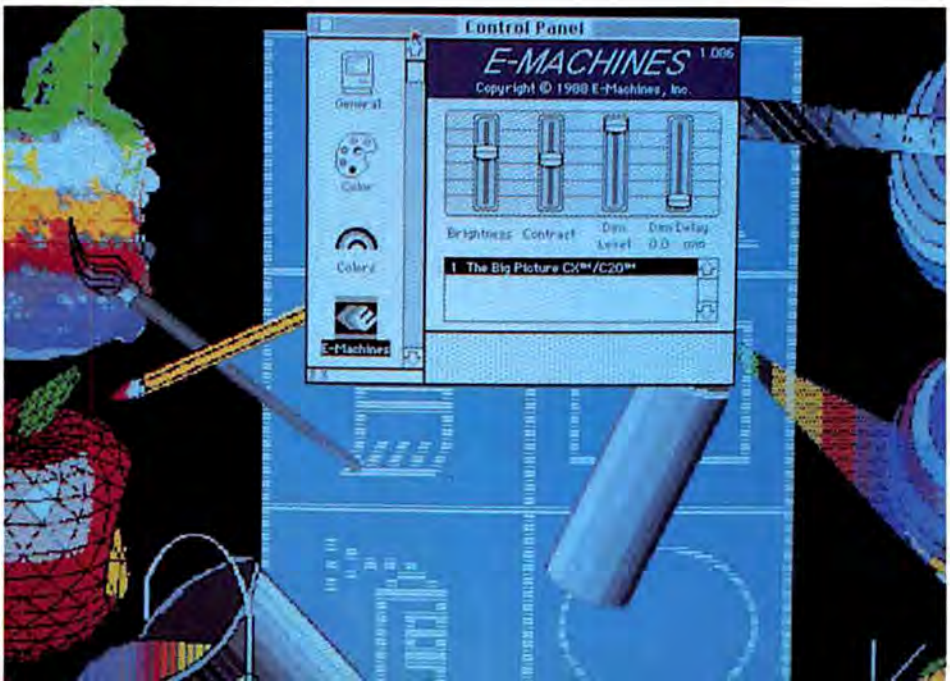
Minor Adjustments

Tired of twiddling the knobs on your monitor, trying to achieve just the right balance between brightness and contrast? Here's a simple solution using Pyro!, a screensaver program that creates a "zero" value black screen.

Get the fireworks going, then crank up the brightness until you see the border around the active screen. Now turn the brightness back down until the border just disappears. Last (but never least), adjust the contrast until the white level is at a usable brightness.

That's all there is to it — and now you know Tip 48 of "101 Ways to Use Screen Savers." — *Andrew Eisner*

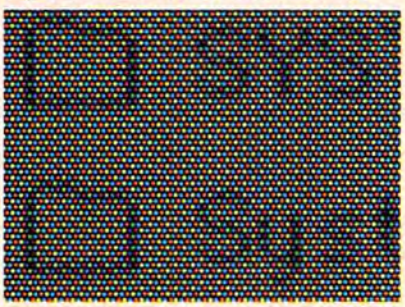
Three monitor makers — E-Machines, Radius, and RasterOps — let you set options through cdevs.



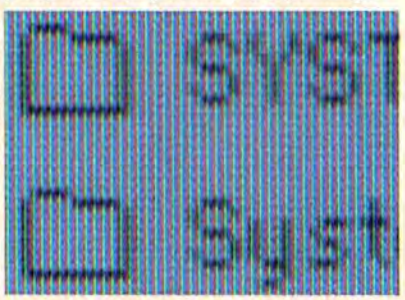
Best Picture

It's true: The Sony Trinitron really looks the best! Of all the monitors we tested, the Trinitrons — manufactured by Sony and marketed by several companies — provided the sharpest pictures. Sony's superiority comes from its screen shape, aperture grille, and one-gun/one-lens beam generation and focusing. To understand what this means, you first have to know how a color monitor works.

In a conventional delta, or *shadow mask,* display, the phosphor is laid down in a pattern of dots, represented here by the SuperMac 19-Inch Standard Color Monitor.



Sony Trinitron monitors use vertical stripes of phosphor, which provides a sharper image.



A CRT (cathode ray tube, or picture tube) resembles a shooting arcade. Three electron beams (one each for red, green, and blue) shoot out of the neck of the tube toward the phosphor-coated screen. The beams whiz around the screen, painting an image by selectively turning on phosphor dots.

In conventional picture tubes, three separate electron guns and focusing lenses are arranged in a triangular, or *delta,* configuration. This arrangement requires very small lenses, which create beam-focusing problems. A related configuration, the precision-in-line (PIL) layout, places the three guns in a horizontal line, which reduces convergence problems. In contrast, Trinitrons use a single gun to produce three identical, horizontally aligned beams, which are focused by a single large lens. This scheme greatly reduces beam error and produces smaller beam spots.

As the beams approach the screen, they converge and pass through a *mask* that makes sure each beam hits only one phosphor color at a time. In conventional tubes, this *shadow mask* is a metal plate riddled with tiny holes — one hole for each phosphor dot. Once through the mask, the beams strike their respective targets. The dots are separated by a black matrix that absorbs stray light. This is the oldest and cheapest CRT technology, but it requires extensive horizontal and vertical alignment.

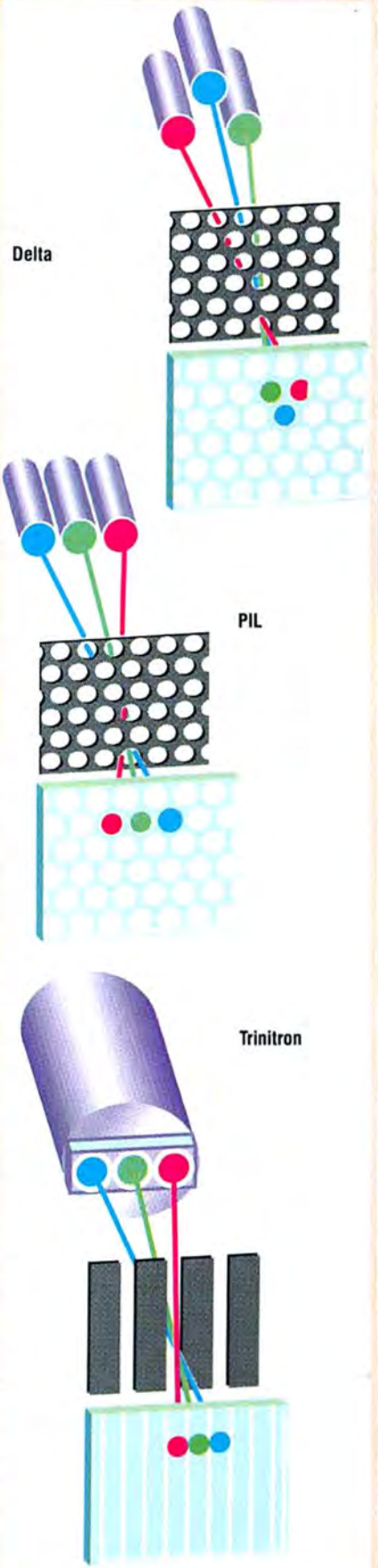
The Trinitron setup uses an *aperture grille,* which has long, vertical slits rather than holes. The electron beams pass through the slits at different angles but in the same horizontal plane. In addition, the phosphor is laid down in vertical stripes rather than dots. The aperture grille has several advantages over the shadow mask:

- It allows more of the beam to pass through, creating a brighter picture.
- Stray beams can overheat and deform shadow masks, but the aperture grille is made of tightly stretched wires, which are less likely to deform.
- The grille is less affected by terrestrial magnetism, which pulls the beam down.
- It reduces rolling flicker because slight vertical shifts of the image don't create brightness changes.

Finally, there's the Trinitron's superior tube shape. Conventional tubes have a spherical surface, like the side of a balloon. Trinitron screens are cylindrical, like the side of a bottle. Thus, while a spherically shaped screen is round in all directions, a Trinitron curves only in the horizontal direction; its vertical axis is straight. This reduces both image distortion and glare.

The Trinitron isn't perfect, however (and you thought this was a commercial). Its main drawback is price — Trinitrons are much more expensive than other color monitors. In addition, the screen is crossed by one or two faint black lines, which are actually the shadows of strengthening wires for the aperture grille.

— Andrew Eisner



form the "gray" Mac desktop or as complex as the multiple color patterns that PixelPaint creates.)

The Radius GS/C Display has the worst case of moiré, which appears as a faint marbled pattern on the screen.



THE OUTER LIMITS

Q: When is a straight line a curve? **A:** When it's near the edge of the screen. That may be a slight exaggeration, but many monitors do have geometry problems, especially at the outer edges of their display. Some have only a slight inward curve at the sides of the screen, a distortion called "pincushioning." Others, particularly the larger models, display circles as ovals and rectangles as squares. Obviously, this is a no-no if you're working with graphics. Even text can be distorted, contributing to eye strain.

Flat Feat

Zenith Data Systems markets the extraordinary Flat Tension Mask Monitor for the IBM PC. This 14-inch color monitor has a completely flat screen, which greatly reduces glare because less ambient light gets reflected from the screen. This results in an unusually white and bright image. The flat screen also eliminates the image distortions endemic to curved screens. You've got to see this monitor to believe it — check it out at your local IBM computer dealer.

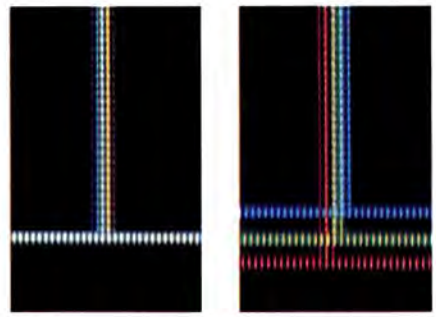
So why isn't this monitor available for the Mac II? Well, the Rumor Manager hears that RasterOps may be modifying their 8-bit Mac video card to drive the FTM monitor. The monitor itself retails for $999, about the same as the Apple High-Res RGB or Sony 1302 Multiscan. If everything gels, flat-screen Mac monitors could be big news a year from now. — *Andrew Eisner*

We checked geometric linearity with the shareware program Test Pattern Generator. We used an image consisting of a large circle in the center of the screen and smaller circles in the corners. Monitors receiving the highest scores had a square screen image and five perfectly round circles. Those with poor scores displayed severe pincushioning or shrinking at the corners of the screen or showed the circles as egg shapes.

COLORING INSIDE THE LINES

Convergence measures how well-aligned the red, green, and blue beams are, on a pixel-to-pixel basis, when they *converge* (come together) at the screen. A monitor with poor convergence shows color *fringing* at boundaries — that is, objects have shadows of red, blue, or green. Misconvergence also affects sharpness, creating blurred images that can cause eye strain.

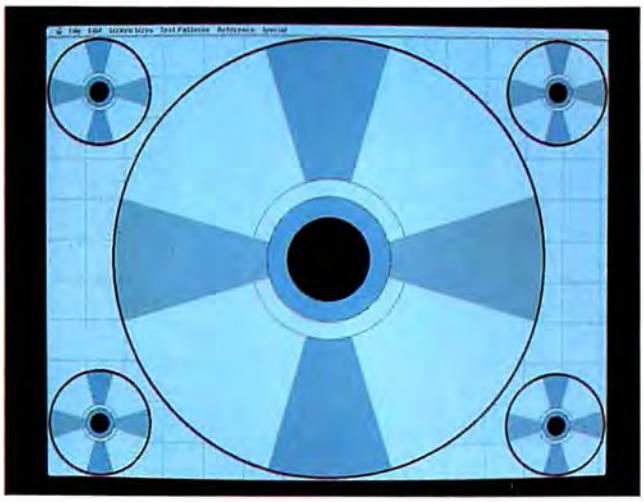
We first eyeballed convergence using the test screen from the Monitors' cdev. Monitors with poor convergence displayed the white lines as separate lines of color. We then used a Klein Convergence Meter to measure the misconvergence of the red and blue guns from the green gun in both the vertical and horizontal directions. We took readings at the center and all four corners of the screen to determine how much of the screen was affected (convergence is often worse at the screen's edges).



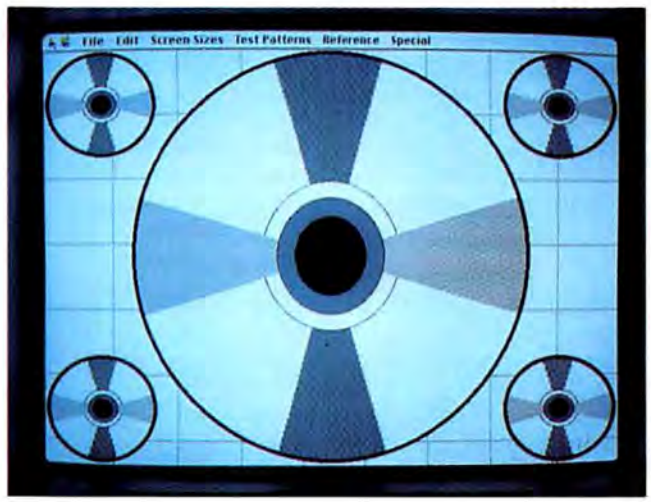
Good convergence is essential for a sharp screen display. The top-ranked monitors produce sharp lines with no color fringing (left). Monitors with poor convergence may display white lines as separate colors (right).

The top-ranked monitors had misconvergences of half a pixel or less. For

Geometric linearity was checked with the Test Pattern Generator. The E-Machines' T16 sailed through this geometry test, displaying straight lines and consistently round circles.



The Princeton Ultrasync can distort high-resolution features. Note the flattened circle in the upper-right corner.



monitors with a density less than 65 pixels per inch, that translates to 0.2 millimeters. Misconvergence is more important — and a greater problem — for high-resolution monitors because there are more pixels present. Monitors with a pixel density greater than 65 pixels per inch need a misconvergence of less than 0.15 millimeters.

A SHARPER IMAGE

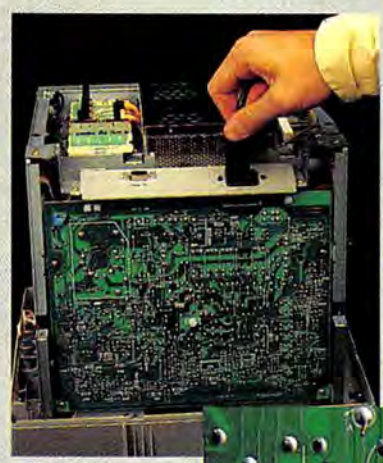
A monitor's sharpness, or focus, can make the difference between a finely striped design and a featureless blob. Basically, sharpness reflects how well you can see fine features (see sidebar, "Pixel Perfect"), and it can make or break a high-resolution monitor. If pixels blur together, small details like dithering and thin lines can be lost, and small font sizes may be unreadable. Thus, monitors with poor sharpness are generally useless for desktop publishing and CAD/CAM applications. The only benefit of poor sharpness is that it smooths the shading generated by half-toning or dithering of colors.

We first did a subjective appraisal of sharpness using an Excel spreadsheet; a circuit pattern from the Douglas CAD/CAM Professional System; a PageMaker document consisting of several font sizes, dithered gray blocks, and a dithered image of a tiger; and a PixelPaint document consisting of vertical and horizontal stripes one pixel thick. Some monitors sailed through this test, while others displayed the PixelPaint stripes as solid grays. Most monitors had no trouble with the Excel and CAD images. The CTX Multiscan, which fared worst, was unable to display the PageMaker document sharply.

For a more objective test of screen sharpness, we measured the horizontal and vertical Modulation Transfer Function (MTF) of each monitor. This simply means we compared the contrast of thin black and white lines to that of large areas of black and white. A monitor with perfect sharpness (100 percent) would display stripes with the same contrast as larger areas. An MTF of at least 15 percent is usually necessary to distinguish short, thin lines and to make small text readable. As expected, monitors had the most trouble displaying the bands of single-pixel vertical lines. The Microvitec Definition scored highest at 65 percent; the Princeton Ultrasync, with a score of only 10 percent, displayed the stripes as a uniform gray area.

A Square Deal

Sony's CPD-1302 Multiscan monitor is comparable in nearly every way to the Apple color monitor, and its street price is hundreds of dollars lower. This sounds great, but there's a catch. The Sony's picture is not on the square — literally. The right and left sides of the screen have unsightly bulges, a distortion called pincushioning, and the bottom of the display is narrower than the top.



But never fear, *MacUser*'s here. If you have 30 minutes and a small plastic screwdriver, we'll show you how to obtain a clean, square image that is arguably better than Apple's own.

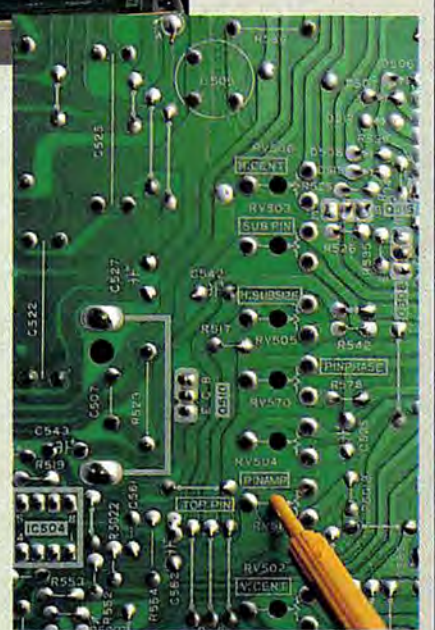
WARNING: If you've never worked around CRTs, do **NOT** attempt this yourself. Potentially lethal electrical charges linger inside the monitor case even when it's unplugged. The risk is especially high here because you'll be adjusting the monitor while it's turned on. If you're not a techie, take these instructions, the monitor, and your Mac II to an authorized Sony dealer and let them make the adjustments for you.

First, remove the monitor's back cover and set the chassis upright next to your Mac. Connect the video and power cables and turn on the monitor and computer. Close all windows on the desktop, leaving only the startup disk icon. Make sure the desktop pattern is the standard-issue gray, and turn off any screen-saving software. Allow the monitor to warm up for an hour before doing the adjustments.

OK, now we're ready to roll. Lay the monitor on its side so that the brightness and contrast controls are facing up. The controls you want to adjust are on the PC board that's on the bottom of the monitor. Do **NOT** make the adjustments from the top of the monitor, as you will be dangerously close to the CRT's high-voltage cables!

Using the plastic screwdriver, turn the PIN AMP control until the screen bows outward at the sides. Adjust the PIN PHASE control so that the peak of the bow is in the middle of the screen on either side. Now use the PIN AMP control to make the sides as straight as possible. A slight pincushion looks perfectly straight when the monitor is sideways, so check your handiwork by looking at the screen right side up.

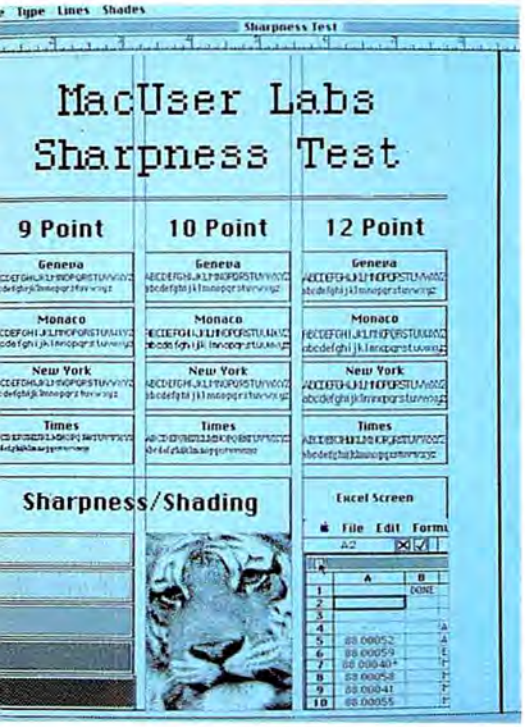
If the bottom of the display is smaller than the top, adjust the SUB PIN control until you get a square picture. You may have to turn it all the way up — we did. Again, double check the results by viewing the screen in an upright position.



To adjust the Sony 1302 Multiscan, remove the cover and turn the monitor over so that you have easy access to the bottom PC board, which contains all the necessary controls.

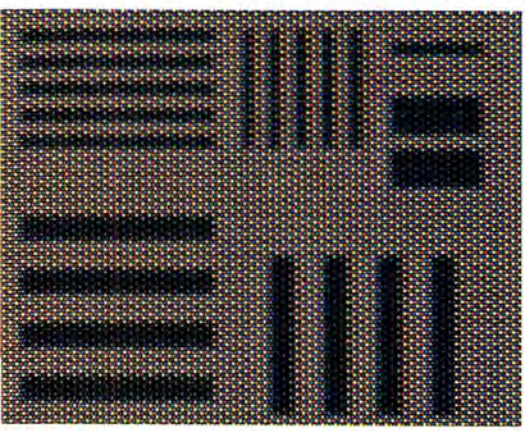
When you're finished, turn everything off, replace the monitor's cover, and degauss the screen if necessary. Your Sony monitor now has a picture that rivals anything on the market.

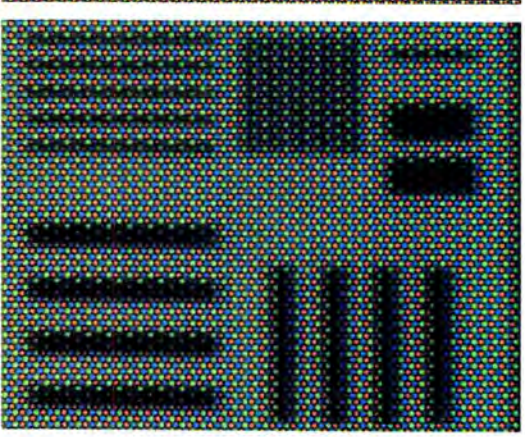
— Jeff Pittelkau



The RasterOps Trinitron provides excellent overall sharpness, and 24-bit color to boot. Even very thin lines show up clearly.

The Microvitec Definition scored highest on the MTF sharpness test. The Mitsubishi Diamond Scan (below) didn't perform as well — note the poor contrast of its single-pixel vertical lines.





MacUser LABS

TRUER COLORS

The Mac II can display almost any color the human eye can see. To be used for serious color work, the monitor must display these colors with the same hue, saturation, and brightness that you see on paper — WYSIWYG, in other words. Software like LaserPaint II and QuarkXPress 2.0 can use the Pantone Matching System (PMS), a standard color key used to convey precise colors to printers. This precision can be crucial in fields like desktop publishing and graphic design. A monitor with poor color quality may show PMS 527 as dark blue when it should be displaying purple. If you select this color thinking it's blue, you'll have a rude awakening when the printer delivers your order. The program correctly stores the color as PMS purple, and the printer matches that. A monitor with good color quality should guarantee that what you see *is* what you get.

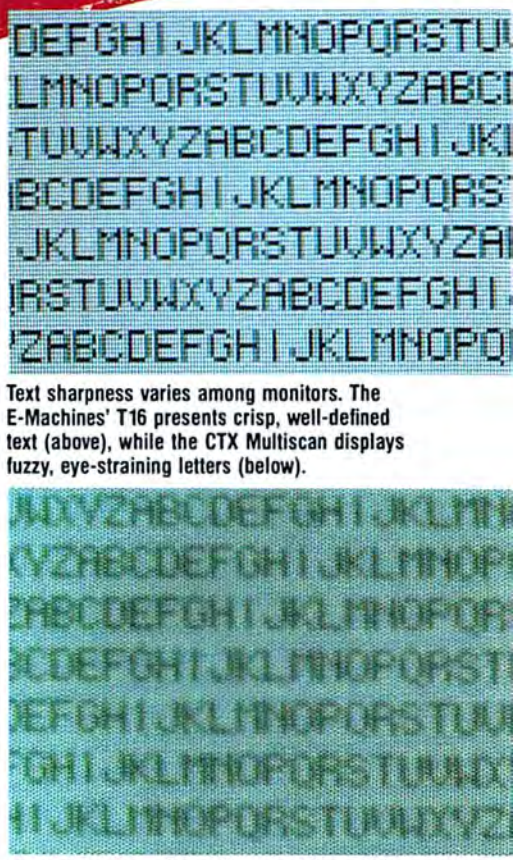
To test color quality, we used a PixelPaint picture containing blocks of pure red, green, and blue, as well as various other colors and gray levels. Since most monitors could display red, green, and blue quite well, we included colors more difficult to reproduce accurately, such as purple, brown, and olive green. All colors were generated using the standard color palette in PixelPaint and Apple's 8-bit video card and High-Res RGB monitor.

Most monitors produced bright, accurate colors as well as good grays. A few showed purple as dark blue or brown as brick red. The Princeton Ultrasync again fared poorly, displaying olive green as black, reds as bright pink, or dark gray as green.

AMAZING GRAYS

The growing prevalence of gray scales in scanned photographs and other images makes *gray purity* (the absence of color in grays) as important as color quality. Indeed, since it reflects the accuracy of the electron guns, gray purity is a good test of color quality.

Grays are actually dim whites — that is, whites of lesser intensity, or brightness. When all three electron beams fire at full (100-percent) intensity, the phosphor glows white. When the beams fire equally but at lower intensities, grays are produced. If one of the beams varies even slightly in intensity from the others, grays will be tinged with color. Poor tracking may be most obvious when displaying dark colors, since the weak beam may not fire and thus a dark red you see on a friend's monitor may be completely black on your own.



Text sharpness varies among monitors. The E-Machines' T16 presents crisp, well-defined text (above), while the CTX Multiscan displays fuzzy, eye-straining letters (below).

We initially examined gray purity with a PixelPaint document made up of adjacent blocks of gray in varying intensities. The gray blocks had a 50-percent dithered stripe running through the middle. (This checkerboard stripe is the same as the Mac's default desktop pattern.) In theory, the dithered stripe is a "true" gray for that monitor, based on the color temperature of its white, and it served as our control in evaluating the gray blocks. The top-ranked monitors had grays that didn't change color with brightness, and thus they will provide excellent color shading. The Radius and Princeton monitors, on the other hand, displayed dark grays as shades of brown or green, respectively.

For a more scientific evaluation of gray purity, we used the Minolta Color Television Analyzer to measure the chromaticity of each monitor's grays. We recorded the values for whites with

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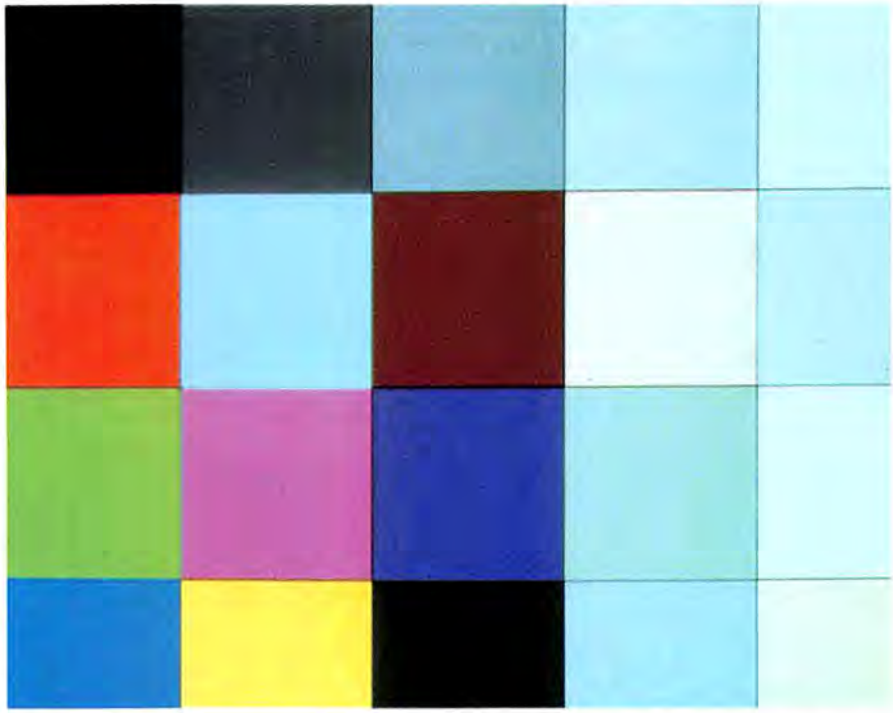
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Color quality was rated using a series of color blocks that included problem colors like brown and olive green. On this RasterOps screen, the brown block looks quite good, but the olive appears almost black.

intensities of 25, 50, 75, and 100 percent (remember that anything less than 100 percent is gray) and determined how far they deviated from "true" gray. The CTX Multiscan displayed the most dramatic example of poor tracking; as the brightness level decreased, the color shifted sharply toward green.

We also evaluated gray linearity to see how well the monitors could display proportional levels of brightness, otherwise known as gray levels. Both the gray linearity and purity tests demonstrated how well the monitors could handle the infinitely variable analog signal produced by the video cards. Monitors with the smallest deviations (less than 10 percent) had even shifts in brightness from one gray level to the next and produced better color shading and more exact color values. The Taxan Ultra Vision was the only monitor to display absolutely perfect gray linearity. Those with poor scores didn't make even (proportional) shifts in brightness between gray levels. On the Princeton Ultrasync, dark gray didn't show up at all. Instead, it appeared black.

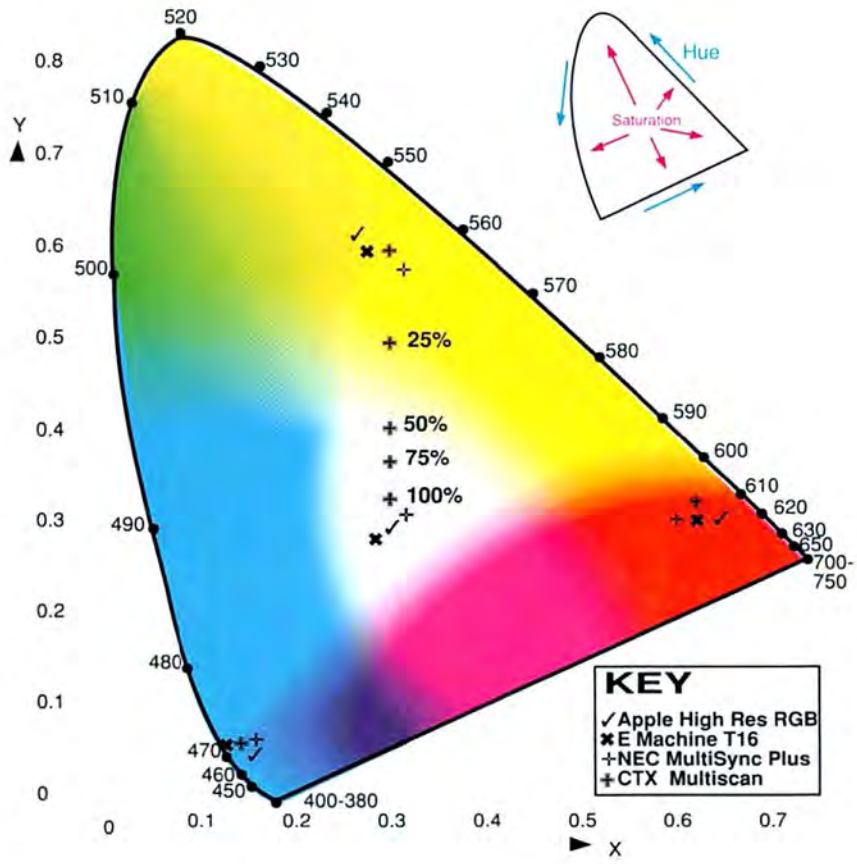
JITTER BUGS

Jitter is the constant shaking of the screen image in any direction. Anyone who has an SE with its original "squirrel-cage" fan is probably familiar with the Shaky Screen Syndrome. Besides causing eye strain, jitter reflects an electronic design problem or defect in the monitor/video card combination.

To assess jitter, we examined the screen image from a normal operating distance and noted whether the screen wavered up and down or to the left and right. We also checked for jitter during disk access. This would normally be a noticeable but tolerable situation, since most disk access occurs during application launching and file saves. However, a few programs like VideoWorks II constantly access the disk, and a shaky screen during a major presentation could give you — and your audience — the jitters.

SHRINKING VIOLETS

Screen shrinkage is caused by the power supply's failure to provide size stability during changes in the screen



Color coordinates of the red, green, and blue phosphors for four monitors are plotted on the CIE chart. Each monitor can generate only the colors inside the triangle formed by these three points; therefore, the closer to the boundaries they are (the more saturated), the better. The value for each monitor's white is shown in the center. The CTX Multiscan's plot reveals the reason for its dismal gray purity. As the white intensity decreases, the green beam becomes dominant, resulting in green-looking dark grays. Note that the chart's shark-fin curve is actually the rainbow. Magentas and purples, which aren't part of this spectrum, are contained in the straight-line portion across the bottom.



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image. Unless screen size is important to you — say, for photographing the screen or using animation, where on-screen images shift constantly — you would probably view it as a nuisance more than anything else. Nevertheless, we measured the change in width of the screen when an all-white image was reversed to black. Excellent results — size reductions of 0.2 percent or less — were obtained by several monitors.

THE ENVELOPE, PLEASE

When all the eyeballing ended and calculations were completed, one monitor stood out: E-Machines' T16 Color Display System. We couldn't find a flaw in this 16-inch Trinitron — even the list price of $3,295 (including the video card but not the stand) seems reasonable. It displays clear, sharp text at moderately high resolution, as well as bright, vibrant colors. And the size is just right: bigger than the 13-inch Apple and Sony but not as massive as the 19-inch Trinitrons. Only time will tell if this odd size becomes accepted. Meanwhile, the T16 gets the MacUser Labs Seal of Approval.

To get the most monitor for your money, we recommend the 13-inch Sony 1302 Multiscan, which has a street price as low as $650. Combine this with the $648 Apple card, and you have an economical color display. If you do a little tinkering under the hood (see sidebar, "A Square Deal"), the Sony's picture is a force to reckon with. Some folks will still prefer to spend the extra $350 for a non-discounted Apple monitor with its non-etched screen and Apple logo. It's one of the best buys, and many people prefer it to the Sony. Our tests showed them running neck and neck, with Apple excelling in sharpness.

Among the 19-inch Trinitrons, we liked the Radius GS/C and E-Ma-

How They Ranked

To create a numerical ranking of the 25 color monitors, we scaled the test results to fit a range of 0 to 100 percent. Final ranking was determined by averaging the scores together and scaling them against the best monitor.

In this graph, the monitors are grouped according to their typical use with the Mac II. The first group includes medium-resolution (640-x-480) monitors that were tested only with the Apple card. The second group contains 19-inch presentation monitors with the same resolution. The final group is made up of high-resolution monitors.

Maximum usable brightness: This is the brightest screen image we could obtain while still maintaining a sharp picture. Even though we made precise measurements, sharpness is really a matter of personal preference, so this is actually a subjective score.

Screen nuisances: We took the most important nuisance factors — pincushioning, shrinkage, ghosting, striping, moiré, jitter, flicker, and glare — and combined them into one group. A higher score means fewer nuisances; a lower score means more nuisances.

Standard Display

	Weighted Average	Gray Quality	Convergence
Sony CPD-1302 Multiscan	94	51	100
AppleColor High Resolution RGB	87	72	60
Princeton Ultrasync	80	57	87
NEC MultiSync Plus	80	69	47
Classic Professional Graphics Display	79	71	87
Mitsubishi Diamond Scan	78	85	53
Relisys Multiscan	76	51	73
Magnavox MAC Color Display	75	75	67
Electrohome Vari-Scan 1310	73	84	67
CTX Multiscan	55	20	60

Presentation Display

NEC MultiSync XL	89	50	87
Mitsubishi C6922	79	66	80
Conrac Auto-Trak 7250	72	87	33
Electrohome Vari-Scan 1910	70	44	67
Microvitek Definition	67	87	0

High-Resolution Display

E-Machines T16 Color Display System	100	84	87
SuperMac 19" Trinitron	96	86	87
E-Machines TX Color Display System	93	77	100
Taxan Ultra Vision 1000	93	100	87
Radius GS/C Display	93	68	80
SuperMac 19" Standard Color Monitor	91	78	73
E-Machines T19 Color Display System	88	66	87
PCPC II	86	92	47
SuperMac 16" Trinitron	82	51	80
RasterOps Trinitron	77	58	60

chines T19 units best, although users of RasterOps and PCPC monitors certainly have nothing to complain about. At $7,690 (including card) for the RasterOps, you have to wonder whether you really need the 24-bit color standard, which is slow and somewhat undefined. The Radius GS/C displays more information — two A4 international-size pages (8 x 11 3/16 inches) — although its 82 ppi misses the boat on true WYSIWYG 72-dpi text. Overall, the 19-inch Trinitrons are clearly in a class by themselves and, if you've got the bucks, are the best bet in large color monitors.

If you're in the market for a 19-inch multiscanning monitor, the Taxan Ultra Vision 1000 gets our vote. It's a well-engineered monitor with by far the highest bandwidth (200 megahertz, twice that of the Trinitrons). It runs on every video card, received perfect scores on the gray purity and color-quality tests, and — best of all — costs $600 less than the Trinitrons.

Among the 19-inch monitors that run only on the Apple card, we can recommend the Electrohome, Conrac, and Mitsubishi entries. These presentation-style monitors all looked good, with sharp pictures and nice whites.

If you're just looking for an inexpensive color monitor to top off your Mac, check out Magnavox, Classic, or Relisys. The Magnavox Analog Color Display is the best of the small shadow-mask monitors, with good color, acceptable text, and a list price of $699. The Classic Professional Graphics Display gets the funk award: It's actually an IBM monitor in disguise. Furthermore, it was manufactured in, of all places, Finland.

Finally, the 14-inch Mitsubishi Diamond Scan wins the versatility award. The Diamond Scan runs on both Apple and IBM cards and can even be used with your VCR!

AILEEN ABERNATHY IS MACUSER'S SENIOR WRITER. A NATIVE OF THE SOUTH, SHE'S STILL ADJUSTING TO THE LEFT COAST LIFESTYLE, ESPECIALLY AVOCADOES, ACUPRESSURE, AND ARUGULA.

Geometric linearity: Higher numbers represent better linearity, judged by looking at circles and straight lines with the Test Pattern Generator.

Subjective sharpness: Sharpness was judged using several screens containing text, graphics, and line drawings. Higher numbers mean sharper image.

Color quality: This subjective judgement was based on a picture containing blocks of various colors. A higher score means better color.

MTF sharpness: This is the amount of contrast between single-pixel black and white lines. We summed the figures for horizontal and vertical dimensions and then averaged them. The theoretical maximum is 100 percent, while 0 percent indicates no contrast at all.

Convergence: We averaged the values obtained for horizontal, vertical, center, and corner measurements. Higher numbers mean better convergence.

Gray quality: We combined measurements from the gray purity and gray linearity tests to obtain one value. As with the other categories, higher is better.

MTF Sharpness	Color Quality	Subjective Sharpness	Geometric Linearity	Lack of Screen Nuisances	Usable Brightness
52	100	100	80	84	62
74	100	100	80	50	46
39	80	60	40	73	100
71	80	80	80	39	67
58	60	60	60	73	57
55	80	80	60	45	62
48	80	60	60	62	75
71	60	80	40	56	54
58	80	60	40	56	40
52	20	40	60	50	63
77	80	80	80	73	67
48	80	60	80	67	42
52	100	80	60	28	39
68	60	60	60	56	49
87	100	60	60	10	42
100	100	100	80	73	43
81	100	80	100	62	43
58	80	80	100	84	43
45	100	80	80	73	56
74	100	80	100	67	49
77	100	60	100	67	50
61	100	80	60	73	59
84	100	80	80	39	48
45	80	60	100	73	58
48	80	80	80	50	57



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MacUser LABS

Capsule Reviews

The Labs staff provides an inside look at each monitor's strengths and weaknesses.

AppleColor High Resolution RGB Monitor

This fixed-frequency, 13-inch monitor is manufactured by Sony to Apple's specifications and has the excellent Trinitron image quality. The monitor's resolution is designed to exactly match that of Apple's video card. Its top-notch color, sharpness, and gray purity make the High-Res RGB the best choice for use with the standard Mac II color card. This monitor looks like it really belongs with the Mac, and it's perfectly adjusted right out of the box.

The High-Res RGB doesn't come with a tilt/swivel stand, but one is available as an option. Most controls, including the degausser switch, are in the rear; brightness and contrast are on the right side. The antiglare treatment consists of darkened glass, the least effective method, so the monitor could have glare problems unless it's used in dim lighting or is set up to eliminate ambient glare.

The High-Res RGB retails for $999, with a 90-day warranty on parts and labor (service available through Apple dealers only). An extended warranty is available. The Mac II's 8-bit color video card costs $648; a 4-bit card is $499, and a 4-bit expansion kit sells for $149.

Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(408) 996-1010

Classic Professional Graphics Display

The Professional Graphics Display is a 13-inch, fixed-frequency monitor. It's really a PC monitor in disguise; the "CLASSIC" sticker on the back can be peeled off to reveal "IBM." If you've been trying to sneak a Mac into your office, stick this monitor on top of the II and your boss will never know the difference.

Power, brightness, and contrast controls are located to the right of the screen. Like several other multiscan monitors, the Classic arrived with a screen image that was too small, and we couldn't enlarge it because there are no horizontal and vertical size controls. The antiglare treatment consists of etched, darkened glass. The shadow-mask CRT is made by Hitachi, and the monitor is assembled by Solaris, a Finnish company.

The Professional Graphics Display is the lowest-priced monitor we tested and offers an acceptable Mac II image for the money, with good, usable colors and grays.

However, it had the lowest bandwidth (17 megahertz) of all the monitors tested, which was reflected in its poor performance on the MTF sharpness test. There were also faint purple and green stripes on the left side of the screen.

The monitor retails for $549 and runs only with the Apple Card. The warranty is six months for parts and labor. Classic Components Corporation has been manufacturing and distributing computer peripherals for both the IBM and Apple markets for five years.

Classic Components Corporation
1490 West Artesia Boulevard
Gardenia, CA 90247
(213) 217-1235

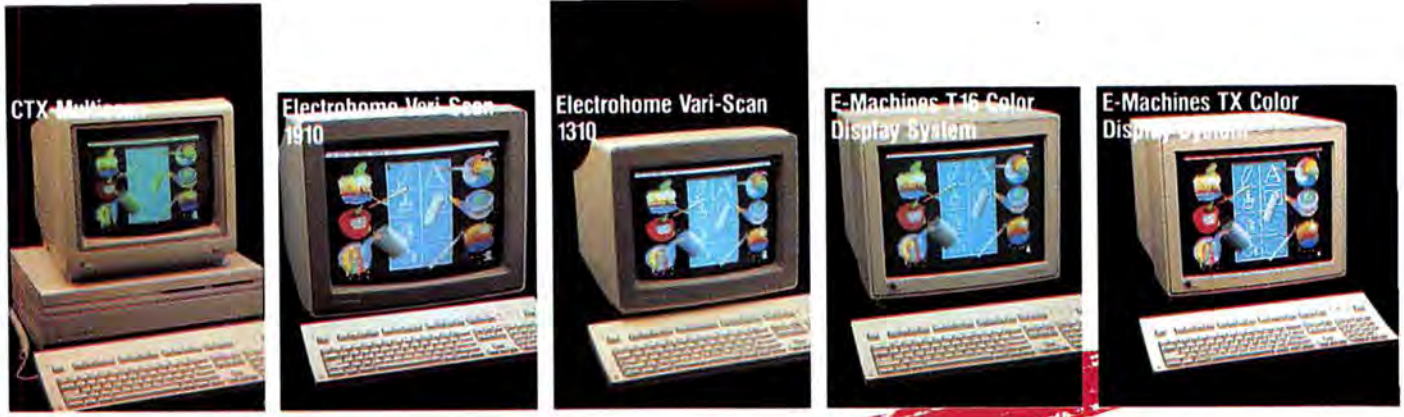
Conrac Auto-Trak 7250

The Auto-Trak 7250 is a good general-purpose, 19-inch monitor for the standard Apple card. The case is boxy, with straight lines and sharp corners. Power, brightness, and contrast controls are to the right of the screen, and etched, darkened glass provides very good glare protection. A tilt/swivel stand is available as an option, and we recommend it; otherwise, the display is too low. The shadow-mask (in-line) CRT is made by Matsushita.

This multiscanning monitor has good colors and performed well on the gray purity and linearity tests. However, its poor convergence and low score on the MTF sharpness test contributed to its last-place finish on the objective tests. The Auto-Trak's 45-ppi screen gives it a magnified image (but prevents true WYSIWYG), and we think it would be a reasonable choice for presentation use with the standard Mac II color card.

The Auto-Trak 7250 also works with IBM's CGA and EGA video standards. The monitor supports interlaced video, which means it can be used with GenLock cards that combine Macintosh graphics with NTSC standard video.

The monitor costs $2,995 and comes with a one-year warranty on parts and labor. Conrac has been manufacturing monitors for more than 40 years.



MacUser LABS

Conrac Corporation
Display Products Group
1724 South Mountain Avenue
Duarte, CA 91010
(818) 303-0095

CTX Multiscan

The 14-inch CTX Multiscan is a compact, light-gray monitor with etched, darkened glass to reduce glare. The unit we tested had no tilt/swivel stand, but CTX plans to include one by the time you read this. Power, vertical hold, brightness, and contrast controls are located below the screen; text mode and position controls are on a rear panel. The shadow-mask CRT is made by NEC.

Like several other multiscan monitors, the CTX was not originally designed to operate with the Apple card and produces a screen image that is too small. It has greenish whites, dim colors, and poor gray purity. The image is blurry, and color quality is so poor that it could quickly lead to eye strain. On the subjective sharpness test, the Multiscan was unable to clearly display text and graphics in a PageMaker document. In short, this monitor finished at the bottom of both the subjective and objective test rankings. The Multiscan would not be suitable for serious gray-scale or color work, nor could it be used to work with graphics or fine text.

The CTX Multiscan retails for $777 and runs with Apple and IBM cards. The warranty is a generous two years for parts and labor. CTX has been making monitors since 1983. The company is based in Taiwan, with a U.S. distributor in southern California.

CTX International, Inc.
260 Paseo Tesoro
Walnut, CA 91789
(714) 595-6146

Electrohome Vari-Scan 1910

This 19-inch multiscanning monitor has a light-gray case with brightness, contrast, and power controls on the front. There are four sets of size and centering controls arranged in a grid on the rear panel. Three are for IBM video formats. The fourth is an override setting that can be used to set the display size for the Mac II. Antiglare treatment is etched, darkened glass. The shadow-mask CRT is manufactured by Matsushita.

The Vari-Scan 1910 has a sharp picture with good color quality, nice grays, and a pleasing paper white. Its 44 ppi gives the screen a magnified image that prevents true WYSIWYG but makes this a good monitor for presentations. The Vari-Scan is one of several multiscanning 19-inch displays we tested that would sync only with the Apple card for the Mac II. It also syncs with IBM color cards, which means it can be used for presentations with both the Mac II and IBM video formats without having to make any size/position adjustments when the monitor is switched between computers. It also supports interlacing for use with GenLock cards.

The Vari-Scan 1910 costs $2,895, and the warranty is one year on parts and labor. Toronto-based Electrohome is one of the granddaddies of the electronics industry. It began making televisions in the 1960s and introduced its first computer monitors in 1968.

Electrohome Limited
809 Wellington Street
Kitchener, Ontario N2G 4J6
Canada
(519) 744-7111

Electrohome Vari-Scan 1310

The Vari-Scan 1310 is a compact, 13-inch multiscanning monitor. Its case is light gray, with power, brightness, and contrast controls on the front. Multiple size and position controls are in the rear and allow the monitor to be adjusted for Mac II and IBM displays independently of each other. A tilt/swivel stand is included, and the screen has etched, darkened glass to reduce glare. The shadow-mask CRT is made by Matsushita.

This monitor has fair color quality and gray purity, but it lacks the sharpness and linearity that it really ought to have for its $1,098 price tag. The image is not square and has a distorted, rippled look to it. The Vari-Scan 1310 uses the Apple color card and also supports interlacing for use with GenLock cards. It also works with IBM's CGA, VGA, and EGA formats. The warranty is one year on parts and labor. (See Electrohome Vari-Scan 1910 for company information.)

E-Machines T16 Color Display System

The T16 Color Display System is a good-looking 16-inch, fixed-frequency monitor housed in a light-gray case with very clean lines. This monitor's size seems just right in many respects. It's larger than the 13-inchers but not as massive and bulky as the 19-inchers. You get the best of both worlds: the increased screen area of a large monitor and the relative compactness of a smaller model.

The controls are all conveniently located on the front, directly below the screen. A Control Panel cdev allows you to adjust contrast and brightness without twiddling knobs, and there's an adjustable screen saver. E-Machines uses a semi-flat, 16-inch Trinitron tube that has a silica coating for glare protection.

The T16 has excellent colors, linearity, and sharpness, and it sells for a lot less than its larger cousins. The T16's one disadvantage, compared to 19-inch monitors, is that it cannot display an entire 8½-x-11-inch page. But the T16 more than compensates for this one shortcoming. Its impressive gray purity and color saturation provide excellent image quality for both color and shading. It has a pleasing white screen and the sharpest image of all the large-screen monitors we tested. In short, it makes no compromises. The T16 is an excellent choice for CAD/CAM or color graphics work. As our top-ranked monitor, the T16 wins the MacUser Labs Seal of Approval.

The T16's $3,295 price includes E-Machines' video card and carries a 90-day warranty on parts and labor. An optional tilt/swivel stand is $249. E-Machines began making computer monitors in 1986. It specializes in display products specifically designed for the Macintosh and developed one of the first large-screen Mac displays in 1986 simultaneously with Radius.

E-Machines
9305 Southwest Gemini Drive
Beaverton, OR 97005
(503) 646-6699

E-Machines TX Color Display System

The TX is E-Machines' high-resolution, two-page Trinitron system. It uses a specially adjusted 16-inch Trinitron that's otherwise identical to the T16 model. The controls, external cosmetics, antiglare coating, and Control Panel cdev are also the same. However, the drive electronics have been revved up to handle the higher scan rates of E-Machines' 1,024-x-808 card, which comes with the monitor.

The screen image isn't as sharp as the T16's,









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but it's still quite good. Color and gray quality are excellent, but the TX's higher resolution may make text hard for some folks to see. Its 87-ppi screen allows two pages to be displayed at once, but it also makes 12-point text look like 10-point text. Thus, the TX is not the monitor to use if you want a WYSIWYG interface. But it's great for freehand painting and CAD work in situations where a 19-inch Trinitron just won't fit the furniture.

The TX sells for $4,495, including card and cables, with a 90-day warranty on parts and labor. The optional tilt/swivel stand is $249. (See E-Machines T16 for company information.)

E-Machines T19 Color Display System

The T19 uses the 1,024-x-808 card of the TX but displays the image on a 19-inch Trinitron. This gives a true WYSIWYG resolution of 72 ppi. The T19 looks like the other 19-inch Trinitrons. It has an OCLI coating for glare reduction and the same controls and cdev as E-Machines' T16 and TX models. Unlike the others, however, the T19 package includes a tilt/swivel stand.

As with the other E-Machines models, the T19 screen image is very sharp and has excellent color quality and gray purity. Image quality is comparable to the T16, and for those who want a larger screen, the T19 is the way to go. E-Machines has once again produced a winner in the color-monitor market.

The T19 is more expensive than the PCPC and SuperMac Trinitrons, but it has a screen refresh rate of 71.3 hertz, compared to 60 hertz for the other two monitors. The higher refresh rate means less flicker is visible on the screen. If the flicker on the PCPC and the SuperMac monitors annoys you but you really want a Trinitron, then the T19 may be worth the extra expense.

The T19 retails for $5,995, including card and cables, and provides the standard 90-day warranty on parts and labor. (See E-Machines T16 for company information.)

Magnavox Analog Color Display

The 14-inch, fixed-frequency Magnavox Analog Color (MAC) Display has a compact, Apple-platinum case with all the controls conveniently located on the front. It comes with a tilt/swivel stand, and the screen is darkened glass with no etching or other treatment to reduce glare. Philips makes the shadow-mask CRT.

Picture quality and color saturation are very good, with slightly warmer whites than those of the Apple monitor. The MAC's screen is not as sharp or clear as the Sony and Apple units, but it's the best of the 12- to 14-inch shadow-mask monitors. It was already adjusted for the Mac II video card when it arrived, so setting it up was just a matter of "plug and go." The screen did have a slight bowing problem at the top.

At $699, the MAC is the second-cheapest monitor in this review. We recommend it as a cost-effective alternative to the Sony 1302 Multiscan or Apple High-Res RGB. It carries a generous two-year warranty on parts and labor. Magnavox, founded in 1911, is the third-largest supplier of stand-alone computer display systems. In 1974 Magnavox was purchased by North American Philips, whose Belgian parent dates back to 1892.

Philips Consumer Electronics
1149 Straw Plains Pike
Knoxville, TN 37914
(615) 521-4366

Microvitec Definition

This 19-inch, fixed-frequency monitor has a case made from sheet metal, with rough edges and exposed screws. The design is bulky and resembles something from the late 1940s. The controls are in an exposed panel on the lower-right front of the monitor. The power switch is in the rear. The unit we tested had a polished, darkened glass screen that was inadequate for reducing glare, but an etched antiglare screen is available as an option. The shadow-mask CRT is manufactured by Toshiba.

The Definition has a sharp image, with good colors and grays. It had the best MTF sharpness score (65 percent), mainly because it's a big monitor running on the Apple card. It has the same resolution as Apple's High-Res RGB but only 43 ppi, resulting in a magnified image. Indeed, we could actually see the individual pixels; they were completely separated on the screen. On the down side, the Definition has a jittery display and bottomed out on the convergence test. Corner convergence was especially bad. It also had a striping problem on the left side of the screen.

The Definition runs only with the Apple card, and the headshell of the cable had to be removed in order to plug it into the Mac II. This monitor can handle interlaced video, so it's compatible with GenLock cards. Although the Definition did well on several of our tests, we can't really recommend it for the Mac II unless you get an etched screen and properly matched cable.

The Definition monitor retails for $2,395. The Mac II cable is $34.92, and the etched screen option is,$129. The warranty is one year on parts and labor. England-based Microvitec is the second largest monitor manufacturer in Europe (after Philips), and the Definition is one of Europe's top-selling monitors for PC applications.

Microvitec, Inc.
1943 Providence Court
College Park, GA 30337
(404) 991-2246

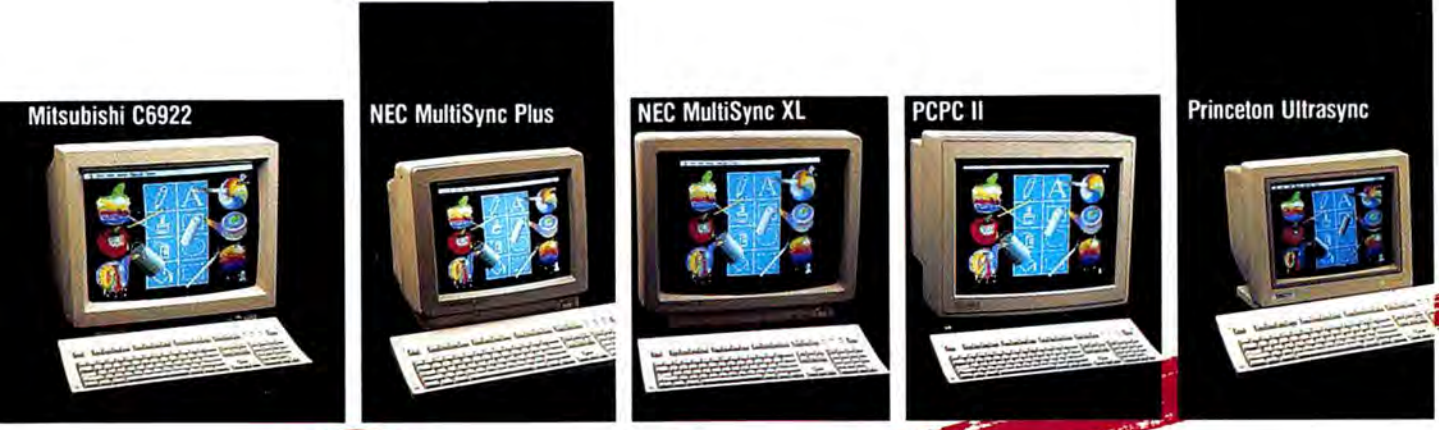
Mitsubishi Diamond Scan

The Diamond Scan is a 14-inch multiscanning monitor with auto-tracking. It's housed in a plain gray case with brightness, contrast, and power controls located on the front. The antiglare treatment is etched darkened glass. Mitsubishi makes its own shadow-mask CRT.

The Diamond Scan is the most versatile monitor we tested. It has three separate inputs, which are selectable from a switch in the back. The connectors accept TTL video from an IBM CGA or EGA card, analog inputs from a Mac II card, and NTSC standard video input. This allows you to connect the Diamond Scan to your Mac II, IBM PC, and VCR all at the same time and switch back and forth without moving cables. A handy tint control lets you set the tint for a standard television picture without affecting the other video inputs.

Although the Diamond Scan's screen is not as sharp as that of the Trinitrons or Magnavox Analog Color, it has an acceptable image for general Mac II color use. It did well on the gray purity, convergence, and usable brightness tests, although it fell short on MTF sharpness. The screen has a severe pincushioning problem and noticeable ghosting (the Trash Can had a twin).

The Diamond Scan sells for $889, plus $39 for the Mac II cable. The warranty is one year on parts and labor. The 1371 model we tested was recently superseded by the 1381, which Mitsubishi says is essentially the same monitor. Japan-based Mitsubishi has been marketing computer peripherals in the United States since 1977.



MacUser LABS

Mitsubishi Electronics America, Inc.
Computer Peripherals Division
991 Knox Street
Torrance, CA 90502
(213) 515-3993

Mitsubishi C6922

The 19-inch C6922 is a multiscanning monitor housed in a large, platinum-colored case that perfectly matches the Mac II's color scheme. The monitor has a very solid chassis, so it's heavy. The C6922 display is also available without the exterior case, which allows it to be used for special applications like console mounting. Etched, darkened glass provides glare protection. Mitsubishi makes its own shadow-mask CRT.

The power, brightness, contrast, and degaussing controls are on the front. Positioning and size controls are inside the case, which is a nuisance if you need to tweak it to improve picture quality. We had to perform just such an operation to get it to sync with the Mac's video card.

The C6922's image quality is good, especially gray purity and linearity. However, it fared poorly on the MTF sharpness test and had a slight ghosting problem. Its 43-ppi screen provides a magnified image suitable for presentations.

The monitor is yours for $2,980, plus $54 for the Mac II cable. The warranty is one year for parts and labor. (See Mitsubishi Diamond Scan for company information.)

NEC MultiSync Plus

The 14-inch MultiSync Plus is a compact, light-gray monitor with numerous controls, all conveniently located on the front. Less frequently used controls are hidden behind a small pop-open panel. The antiglare protection is etched, darkened glass, and the monitor has a quiet (but audible) internal fan that prevents overheating. NEC manufactures its own shadow-mask CRT.

The MultiSync Plus was not originally designed to work with the Apple card and consequently produces a screen image that is too small, leaving more than an inch of unused screen on every side. The monitor also works with the E-Machines medium-resolution card, which produced much better results.

The MultiSync Plus has a flat, square screen image with good contrast and excellent gray scaling. Color saturation and gray purity were both quite good, but the image was not as sharp as that produced by the Trinitrons. The MultiSync Plus costs $400 more than the Apple monitor, and we don't recommend spending the extra money if you just plan to use it with the Apple card. With the E-Machines card, however, the MultiSync Plus would provide a good, high-resolution display for about $1,000 less than a 16-inch Trinitron.

This monitor retails for $1,399, plus $19.95 for the Mac II cable. The warranty is one year on labor and two years on parts. Tokyo-based Nippon Electronics Company (NEC) has been selling electronics products in the United States for more than 22 years.

NEC Home Electronics
1255 Michael Drive
Wood Dale, IL 60191
(312) 860-9500

NEC MultiSync XL

The 19-inch MultiSync XL has a large, light-gray case with numerous controls in the front. Less frequently used ones are hidden behind a small pop-open panel. Etched, darkened glass is used for glare control. NEC manufactures its own shadow-mask CRT.

Like its cousin the MultiSync Plus, this monitor was not originally designed to work with the Apple card and consequently produces a screen image that is much too small.

The shadow-mask tube doesn't offer the same sharpness as a Trinitron; instead, it produces a fuzzy image that plays havoc with text and fine details. But the MultiSync XL has a bright picture and is a reasonable choice for use with most large video cards except the Radius, which has a scan rate that is too high for the XL. If you really need more pixels but can't afford a Trinitron or the Taxan Ultra Vision, this is the monitor for you.

The MultiSync XL retails for $3,199, plus $19.95 for the Mac II cable. The warranty is one year on labor and two years on parts. (See NEC MultiSync Plus for company information.)

PCPC II

This 19-inch, fixed-frequency Trinitron is housed in the same light-gray case as the other big Trinitrons, with power and contrast controls located below the screen. It has an OCLI coating to reduce glare.

The PCPC II has the typical Trinitron hallmarks of good sharpness and color, although it has a noticeable flicker and jitter and a slight bowing problem at the top of the screen. The unit we tested also had problems with its internal convergence adjustment. The external vertical and horizontal convergence controls would align the screen only in the center, so the edges remained out of alignment. This misalignment probably resulted from rough handling during shipping or misadjustment at the PCPC or Sony factories, since none of the other Trinitrons had alignment problems.

At $5,545, the PCPC II is the least expensive of all the 19-inch Trinitron monitors we tested. The price includes the PCPC CGC/2 video card, and the warranty is one year on parts and labor. If you want an economical Trinitron, check this one out. Personal Computer Peripherals Corporation (PCPC), established in 1981, manufactures computer peripherals and software.

Personal Computer Peripherals Corp.
6204 Benjamin Road
Tampa, FL 33634
(813) 884-3092

Princeton Ultrasync

The Princeton Ultrasync is a compact, 12-inch multiscanning monitor with a greenish gray case. The power switch, text mode, brightness, and contrast controls are located on the side. Size, position, and underscan/overscan controls are on a rear panel. The shadow-mask CRTs, which use etched, darkened glass for glare reduction, are made by several firms.

The Ultrasync was the only monitor capable of producing a screen image so bright it overloaded the Minolta Color TV Analyzer. It had a bright, contrasty, glare-free image that made it usable even when facing an open window or under bright lights.

This monitor had some serious electronic problems, however. Cycling the contrast control through its full range caused the display to change from pink to purple to blue to, finally, green. It was almost impossible to adjust this monitor to a preferred brightness and contrast setting without losing "white" whites.

The Ultrasync fared poorly on several tests. It had one of the lowest color quality ratings of all the monitors. For example, dark grays looked green,

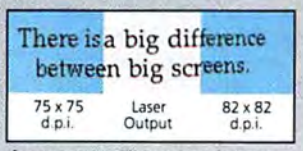
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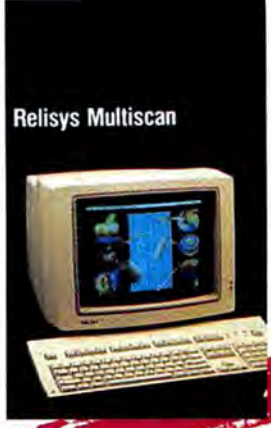
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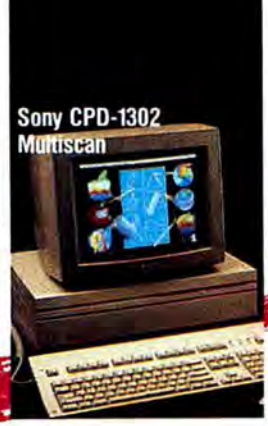
All screens shown are unretouched photographs of running displays. The desktop publishing example was created with Quark XPress.™ The CAD document was created with Versacad.™ MegaScreen, MegaTalk and WYSIWYW (What You See Is What You Want) are Trademarks of MegaGraphics, Inc. Apple and AppleTalk are Registered Trademarks and Macintosh is a Trademark of Apple Computer, Inc. Versacad is a Registered Trademark of Versacad Corp. Quark and XPress are Trademarks of Quark Incorporated. MegaGraphics is an Authorized Apple Value Added Reseller. ©1988, MegaGraphics, Inc.

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which is clearly not good for gray-scale or color work. The Ultrasync also had the worst sharpness, scoring only 10 percent on the MTF test. It displayed a series of thin black-and-white stripes as a uniform gray area. It also fared poorly in gray linearity; the darkest grays looked black.

The Ultrasync retails for $849, plus $19.95 for the Mac II cable. It runs only with the Apple card and carries a one-year warranty on parts and labor. Princeton Graphics Systems is a six-year-old company that makes computer peripherals for the IBM and Macintosh markets.

Princeton Graphics Systems
601 Ewing Street, Building A
Princeton, NJ 08540
(609) 683-1660

Radius GS/C Display

This 19-inch color monitor is a fixed-frequency Trinitron with power and contrast controls located on the front panel. It has a tilt/swivel stand and an OCLI coating that provides excellent glare reduction.

Radius did not follow the 72-ppi Apple standard with the GS/C. Instead, it created an 82-ppi screen that allows you to display two A4 international-size pages on the screen at once (A4 is 8 inches wide by 11 3/16 inches long).

Image and color quality are good, although grays are displayed as shades of brown. Also, a purple and green moiré pattern appears in any dithered image such as the Mac desktop. If Radius would adjust its monitors more carefully, the GS/C Display could become the standard for color desktop publishing and a top choice in the 19-inch Trinitron/8-bit color card market.

The GS/C also comes with a Control Panel cdev featuring tear-off menus that can be positioned anywhere on the desktop. The choices include larger font sizes for pull-down menus to make them easier to read, an 8-bit color screen dump that works with the already familiar Command-Shift-3 sequence, and the Radius screen saver. Yet another nice feature: The Radius card is disabled if the cord to the monitor is disconnected while the Mac is turned on. This is useful if you want to use the Mac without the Radius monitor but don't want to open the Mac and remove the card.

The monitor/card combination costs $6,190 and comes with a 90-day warranty on parts and labor. The monitor alone is $4,295, and the video card is $1,895. Radius was founded in 1986 by several members of the original Macintosh design team. It makes and markets monitors, graphics boards, and accelerator cards.

Radius
404 E. Plumeria Drive
San Jose, CA 95134
(408) 434-1010

RasterOps Trinitron

This 19-inch, fixed-frequency Trinitron is housed in a large, light-gray case with power and contrast controls on the front panel. It has a tilt/swivel stand and an OCLI coating that provides excellent protection against glare.

This is the only combination of a 24-bit color card and monitor that we tested. Overall image quality was impressive, with excellent color and grays. There was a significant flicker problem, however.

A Control Panel cdev allows you to switch between 8- and 24-bit color. The RasterOps card has speed characteristics comparable to the other high-resolution (1,024-x-768) cards in 8-bit mode, but it's excruciatingly slow in 24-bit mode. In the latter mode, pull-down menus are drawn and erased one color at a time. However, new color scanners and software such as LaserPaint II support the 24-bit color format, which provides remarkable color display and editing capabilities. Barneyscan images from 35-millimeter color slides looked quite good.

The RasterOps display system is the most expensive one on our list, due to its unique video card. The monitor retails for $4,195, and the 24-bit card is $3,495. The warranty is one year on parts and labor for the monitor and 90 days on the card. RasterOps, founded in mid-1987, is devoted solely to color graphics display systems.

RasterOps
10161 Bubb Road
Cupertino, CA 95014
(408) 446-4090

Relisys Multiscan

The Relisys Multiscan is a 14-inch monitor housed in a light-gray case. The antiglare treatment is etched, darkened glass. The power switch is under the front panel, and there are four LED lights on the front to indicate active mode and power. Centering and size controls are in a small control panel on the right side. The shadow-mask CRT is manufactured by NEC.

Like several other multiscanning monitors, the Relisys was not originally designed to operate with the Apple card and produces a screen image that is too small. Unfortunately, there is no horizontal size control, which meant we couldn't compensate for this problem.

The Multiscan is a good low-priced monitor. It worked well with the Apple color card but was plagued with faint, rolling interference lines that were especially noticeable on a white screen. White screens also looked a bit grainy.

The monitor costs $795. Add another $25 for the Mac II cable. The warranty is two years on parts and 15 months on labor. Relisys, like RasterOps, is a newcomer, having been in business only a year and a half. It is a subsidiary of Teco of Taiwan, which has been making computer peripherals for nine years.

Relisys
320 South Milpitas Blvd.
Milpitas, CA 95035
(408) 945-1062

Sony CPD-1302 Multiscan

This 13-inch multiscanning Trinitron monitor has a compact, medium-gray case with power, brightness, and contrast controls located on the right side. Size and position controls are in the rear. The antiglare treatment is etched, darkened glass. Sony makes its own (and everybody else's) Trinitron CRTs.

The 1302 Multiscan is perhaps the best small-screen monitor available. Although it has a severe pincushioning problem out of the box, there are conveniently labeled controls inside the case that allow readjustment. If you accomplish this, there's no comparison with the other small monitors tested.

Indeed, the Multiscan produces an image equal to or better than the Apple High-Res RGB monitor. Its etched screen softens the image slightly but provides immensely better glare resistance than Apple's darkened glass. The Apple monitor had sharper convergence in the center of the screen, but the Multiscan's convergence was good

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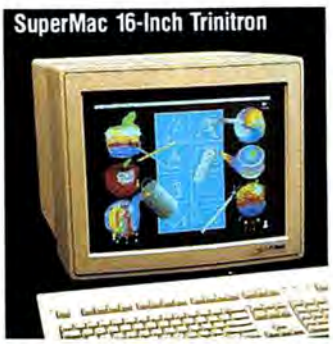
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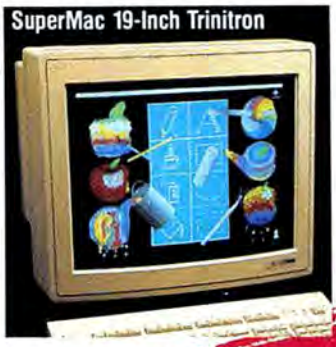
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MacUser LABS

throughout the entire screen, including the corners. Overall, Sony's Multiscan wins the small monitors battle because it gives a steady, sharp, colorful display for a lot less money.

The 1302 Multiscan retails for $1,045, which includes the monitor, stand, and Mac II cable. Sold separately, the monitor is $995, the cable $29.95, and the stand $39.95. It runs only with the Apple card, and the warranty is two years on the CRT, one year on all other parts, and 90 days on labor.

Sony recently introduced the CPD-1303 Multiscan, a cheaper ($825) version of the model we tested. The 1303 has a polished glass screen that provides greater clarity but increases glare, and it has a larger dot pitch, which may reduce sharpness.

Japan-based Sony needs no introduction. Besides its phenomenal consumer electronics business, Sony is an original-equipment manufacturer (OEM) supplier to the computer industry and has marketed peripherals under its own name for three years. Of the 25 monitors we tested, Sony manufactured 10 of the CRTs along with a substantial portion of the other electronics. It has produced important components of the Macintosh from the beginning, including disk drives, power supplies, and the Multiscan's major competitor, the Mac II color monitor.

Sony
Sony Drive
Park Ridge, NJ 07656
(201) 930-1000

SuperMac 19-Inch Standard Color Monitor

This 19-inch, fixed-frequency monitor has a light-gray case with power, contrast, and brightness controls located on the right side. It has an etched screen to reduce glare. Matsushita makes the shadow-mask CRT, and Ikegami assembles the monitor.

The monitor comes packaged with SuperMac's own video card. Unfortunately, the combination produces a flickery, fuzzy image. The low, 60-hertz vertical scan rate of the SuperMac card causes the flicker. This monitor costs $1,000 more than its closest competitor, the NEC MultiSync XL, without offering an appreciably better picture.

The complete display system retails for $4,795, and the warranty is one year on parts and labor. SuperMac, which markets Mac peripherals, was founded in 1985 and purchased by Scientific Micro Systems in 1987.

SuperMac Technology
295 North Bernardo
Mountain View, CA 94043
(415) 964-8884

SuperMac 16-Inch Trinitron

SuperMac's 16-inch, fixed-frequency Trinitron monitor has a light-gray case with power and contrast controls on the front panel. It has a tilt/swivel stand and a special screen coating (probably silica) to cut glare.

This monitor is perhaps too small for the SuperMac card, because a noticeable loss of typical Trinitron sharpness occurred when we connected it to the 1,024-x-768 card. The moiré pattern on the screen was very disturbing, and the 60-hertz vertical scan rate of the SuperMac card resulted in a mild screen flicker. The 86-ppi screen produces a smaller image that lacks true WYSIWYG. The E-Machines card, with a resolution of 832 x 624, seems more reasonable for a monitor of this size.

The monitor's $4,395 price includes the SuperMac card. The warranty is one year on parts and labor. (See SuperMac 19-Inch Standard Color Monitor for company information.)

SuperMac 19-Inch Trinitron

SuperMac's entry in the 19-inch, fixed-frequency Trinitron competition is housed in a large, light-gray case with power and contrast controls on the front panel. It comes with a tilt/swivel stand and has an OCLI antiglare coating.

This monitor finished third overall in both the subjective and objective tests. It had superior color saturation and grays, as well as good sharpness and nearly perfect geometric linearity. The 60-hertz vertical scan rate of the SuperMac card caused an annoying flicker, but otherwise the image equaled that of any other 19-inch Trinitron.

The $5,795 retail price includes the card. The warranty is one year on parts and labor. (See SuperMac 19-Inch Standard Color Monitor for company information.)

Taxan Ultra Vision 1000

This 19-inch multiscanning monitor has an attractive light-gray case with power, brightness, and contrast controls located below the screen. Screen size and position controls are cleverly hidden underneath the display in a drop-down box that's easily accessible. The shadow-mask CRT is made by Mitsubishi and has an OCLI coating to reduce glare.

The Ultra Vision's picture quality is the next best thing to a 19-inch Trinitron, and it costs a lot less. In addition, this monitor has a wide range of input frequencies. The Ultra Vision is the most "multi" of all the multisync-type monitors. It works well with all the video cards we've mentioned, from Apple to Radius, and will probably handle new cards as they appear. The Ultra Vision's 200-megahertz bandwidth was the highest by far — 100 megahertz higher than the 19-inch Trinitrons.

The Ultra Vision far outdistances its 19-inch shadow-mask rivals. It has excellent color quality and received virtually perfect scores on the gray purity and gray linearity (brightness) tests. A 640-x-480 display doesn't begin to tax its capabilities. The Ultra Vision's biggest problem was screen shrinkage, which was 1.6 percent.

The monitor retails for $3,695, with a one-year warranty on parts and labor. Taxan, a subsidiary of Kaga Electronics, makes monitors, CAD/CAM, and desktop systems for both Macintosh and IBM computers.

Taxan
368 Montague Expressway
Milpitas, CA 95035
(408) 946-3400

KUDOS

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Jeff Pittelkau, testing technician.

Diane Wilde, technical writer.



"This baby is loaded with extras..."

Kristi Coale,
MacUser magazine

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When Kristi Coale of MacUser magazine looked at our Master Piece* Mac II, she had expected it to have extra outlets, individual and master switches, surge suppression, and noise filtering. But she was impressed to find modem surge suppression and a swivel base, too. All for $159.95.

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Monitor Criteria

Screen size: This is the diagonal measurement of the CRT as it comes from the factory. Although manufacturers use this figure to indicate screen size, it seldom represents the actual measurement of the exposed screen.

Active screen: This is the active area of the screen, or raster image, as we measured it.

Power consumption: A monitor rated at 100 watts uses as much electricity as a 100-watt light bulb.

Tube manufacturer and type: This shows who made the CRT and whether it's a Trinitron or shadow-mask model.

Power-on indicator: Most monitors have blank screens when the computer is off, so this light reminds you that the monitor is still on. This is useful because prolonged use can make a monitor grow old quickly.

Text mode: This lets you change the background color from white to amber, blue, or green. Only the Princeton Ultrasync had a text switch that actually worked with the Mac's video card.

Brightness and contrast: These frequently used controls let you adjust brightness and contrast to meet ambient lighting conditions. Some monitors have only a contrast control.

Vertical and horizontal controls: Positioning controls center the screen image, while size controls adjust its height and width. Some monitors lack one or more of these controls, and you may not be able to make the screen image large enough.

Degaussing: A degausser removes magnetic interference that can distort the screen image. Many monitors have degaussers integrated into the on/off switch, so that the screen is degaussed each time the monitor is turned on.

Dot pitch: This is the spacing, in millimeters, between like-colored phosphor dots on the screen. Smaller is usually better.

Glare resistance: The top rating of 5 was reserved for monitors with OCLI coatings. Since all the monitors had some form of glare protection, 2 was the lowest possible score.

Brightness continuity: Monitors that could display a solid white rectangle over the entire screen received an "OK." Those with blotchy screens or dim corners were marked down. Trinitron monitors generally performed better than shadow-mask monitors on this test.

Maximum usable brightness: Using the Minolta Color TV Analyzer, we measured the brightest screen image, in foot-lamberts, that could be sharply displayed under EV9 (subdued) room lighting.

Moiré: Monitors without moiré received a 0. Those with distinct wavy patterns were given a 1 or 2, depending on severity.

Geometric linearity: Monitors that displayed a square image and the five circles of the Test Pattern Generator earned a 5. Scores went down for irregular screen shapes or squashed circles.

Pincushioning: If the screen bowed inward at the top or sides, the monitor received a 1 or 2 (worst).

Shrinkage: If the screen shrank when a white image was switched to black, we calculated the percentage of difference in screen size.

Sharpness: Monitors that could easily resolve single-pixel lines in the PixelPaint document received a 5. Those that failed this test but could display an excellent CAD image got a 4. Monitors that displayed usable images from PageMaker, Excel, and CAD documents scored a 3. The lowest scores went to monitors that could not clearly display text in a PageMaker document.

Color quality: Monitors were ranked from 5 (best) to 1 (worst) based on how accurately they displayed various colors. Lower scores indicate color mismatches or tinted grays.

Gray purity: Monitors with scores below 5 had grays tinged with color or dark grays that appeared black.

Misconvergence: We used a Klein Convergence Meter to determine the largest deviation (in millimeters) of either the red or blue gun from the green gun at the center of the screen and in the worst corner.

Gray linearity: Using the Minolta Color TV Analyzer, we calculated the amount of deviation from true proportional brightness when the monitor displayed gray levels of 25, 50, 75, and 100 percent (white). The lower the percentage, the better.

Gray impurity: Again using the Minolta Color TV Analyzer, we measured the chromaticity of each monitor's grays at different levels of brightness. A higher percentage means a greater deviation from "pure" gray; that is, the grays will be tinged with color.

Chroma values: These are the x-y coordinates of color for pure white, red, green, and blue. By plotting them on the CIE Chromaticity Chart, you can determine how truly saturated the colors are on a given monitor, as well as how white the whites are.

White color temperature: The x-y chromaticity values for each monitor's white were matched to color temperatures on the CIE chart. Lower values indicate a warm, yellowish white. Higher values represent a cooler, bluer white.

Modulation Transfer Function (MTF) values: We measured the MTF, or contrast, of one-pixel horizontal and vertical lines. A high score means the lines were easily distinguished. A very low score indicates no contrast between adjacent lines — they appear to be a gray block. A score of at least 15 percent is required to resolve small features.

Apparent misconvergence: This is a subjective measurement that indicates to what degree the red, green, and blue guns were not in alignment.

Dot-to-pixel ratio: This is the number of phosphor-dot triads that make up each pixel.

Vertical-line overlap: This is the degree to which single-pixel vertical lines overlap one another. The ideal is 100 percent — the lines just touch each other with no break. A lower percentage means vertical lines overlap each other slightly. More than 100 percent means pixel lines are separated by thin lines of black.

Video inputs: The Mac II uses an analog input, which is commonly used by high-resolution gray-scale and color monitors. NTSC is the television video signal also used by VCRs and computer game units. TTL is IBM's standard digital format, and all monitors that list TTL capability will run on any IBM or clone.

Resolution: This is simply the number of pixels displayed along the horizontal and vertical axes of the screen.

Pixels per inch (ppi): We determined a monitor's ppi by dividing the number of horizontal pixels by the width of the active screen. The ppi measurement affects how compressed or spread out characters and graphics appear to be on the screen.

Maximum resolution: Some monitors can produce higher resolutions when matched with the appropriate video card.

Bandwidth: This measures how fast the electronics can turn the beams on and off. High-resolution monitors require high bandwidths to prevent horizontal blurring of pixels.

Vertical scan (refresh) rate: This is the number of times per second (hertz) that an image is put on the screen. Rates lower than 65 hertz will usually cause noticeable flicker. Conversely, flicker is rarely observed in monitors with refresh rates higher than 65 hertz.

Horizontal scan rate: This is the number of horizontal lines displayed per second. It depends on the number of vertical picture elements and the refresh rate. If you multiply the vertical resolution by the refresh rate, you get a fair approximation of horizontal frequency. If you add in the horizontal blanking time, the figure is closer to the actual scan rate.

Cable length: This can be important, since monitors are too large to be placed atop the Mac II. If interference is a problem, make sure to get an FCC-approved cable.

Connector type: Apple uses a nonstandard 15-pin cable to connect the monitor to the computer. The analog standard is 9 pins, which is used by most multiscanning monitors. Many large monitors, such as the Trinitrons, use a BNC cable. Be sure to ask for a cable that fits the Mac II.

			APPLECOLOR High Resolution RGB	CLASSIC Pro. Graphics Display	CONRAC Auto-Trak 7250
Screen size:			13"	13"	19"
Active screen:	*Diagonal*		11 1/2"	11"	17 5/8"
	Width x Height		9 1/4" x 6 7/8"	8 3/4" x 6 3/4"	14 1/8" x 10 5/8"
Case dimensions (W x H x D):			13 1/2" x 11 3/4" x 15"	15" x 11" x 15.5"	19" x 14" x 21"
Weight:			34 lb	34 lb	68 lb
Footprint (sq. in.):			203 w/out stand	232.5 w/out stand	399 w/out stand
Power consumption:			160 watts	87 watts	170 watts
Ergonomics:	*Tilt/swivel stand*		optional	no	optional
	Glare treatment		polished, darkened glass	etched, darkened glass	etched, darkened glass
Tube manufacturer & type:			Sony Trinitron	Hitachi shadow mask	Matsushita shadow mask
Controls:	*Power switch and indicator*		√ rear √ front	√ front √	√ rear √ front
	Text mode/color		—	—	—
	Brightness		√ right √ (sub on rear)	√ front	√ front
	Contrast		√ right side	√ front	√ front
	Vertical position		√ rear	—	—
	Vertical size		√ rear	—	—
	Horizontal position		√ rear	—	—
	Horizontal size		√ rear	—	—
	Degaussing		√ rear	automatic	√ front
	Other		H & V convergence - rear	—	—
			focus - rear		
Image quality:	*Dot pitch*		.25 mm	.31 mm	.31 mm
	Glare resistance		2	4	4
	Ghosting/smearing/striping		none	faint stripes	none
	Flicker/jitter		none	none	jitter during disk access
	Brightness continuity		OK	not OK	not OK
	Max. usable brightness		18.4 ft-L	22.8 ft-L	15.7 ft-L
	Moiré		0	0	1
	Linearity		4	3	3
	Pincushioning		0	0	0
	Shrinkage		.2 %	0 %	.3 %
	Sharpness		5	3	4
	Color quality		5	3	5
	Gray purity		5	3	4
Objective tests:	*Center misconvergence*		.1 mm	.1 mm	.25 mm
	Corner misconvergence		.4 mm	.2 mm	.45 mm
	Gray linearity		40 %	51 %	27 %
	Gray impurity		23 %	15 %	7 %
	100% white chroma	*x*	.282	.286	.267
		y	.295	.309	.302
	white color temperature		9.9 K	8.0 K	9.0 K
	100% red chroma	*x*	.644	.627	.628
		y	.314	.325	.322
	100% green chroma	*x*	.271	.299	.270
		y	.605	.580	.600
	100% blue chroma	*x*	.144	.143	.145
		y	.054	.051	.052
Sharpness:	*Horizontal 1-pixel MTF*		50 %	20 %	15 %
	Vertical 1-pixel MTF		65 %	70 %	65 %
	Apparent misconvergence		mild H + V	mild H + V	moderate H
	Dot-to-pixel ratio		1.5 : 1	1.3 : 1	2.0 : 1
	Vertical-line overlap		100 %	110 %	100 %
Video inputs:			Analog RGB	Analog RGB	TTL & Analog RGB
Resolution (ppi) as tested:			640 x 480 (69 ppi)	640 x 480 (73 ppi)	640 x 480 (45 ppi)
Maximum resolution:			same as above	same as above	1,024 x 600
Bandwidth:			23 MHz	17 MHz	40 MHz
Vertical scan (refresh) rate:			66.7 Hz	66.7 Hz	47 Hz - 80 Hz
Horizontal scan rate:			35 kHz	35 kHz	15.75 kHz - 37 kHz
Cable length:			3 1/2 ft	5 ft	5 ft
Connector type:			detachable 15-pin D	attached 15-pin D	detachable 9-pin D
Documentation:			Good Apple manual, 24 pp	Photocopied pages from	28 pp
				Classic's IBM display manual	
Service and support:			Dealers and AppleLink	Dealers and manufacturer	Distributors and outlets
Warranty info:			90 days	6 months	1 year
Price:	*Monitor*		$999	$549	$2,995
	Card		$648 (Apple)	$648 (Apple)	$648 (Apple)

			CTX Multiscan	ELECTROHOME Vari-Scan 1910	ELECTROHOME Vari-Scan 1310
Screen size:			14"	19"	13"
Active screen:	*Diagonal*		11 3/4"	17 3/4"	12 7/8"
	Width x Height		9 3/8" x 7"	14 1/2" x 10 1/4"	10 1/2" x 7 1/2"
Case dimensions (W x H x D):			14 3/4" x 13 3/4" x 15 1/2"	19" x 17" x 19"	14" x 15" x 14 1/2"
Weight:			28.16 lb	72.8 lb	30 lb
Footprint (sq. in.):			228 w/out stand	361 w/out stand	203 w/out stand
Power consumption:			75 watts	150 watts	80 watts
Ergonomics:	*Tilt/swivel stand*		no (available in August)	no	yes
	Glare treatment		etched, darkened glass	etched, darkened glass	etched, darkened glass
Tube manufacturer & type:			NEC shadow mask	Matsushita shadow mask	Matsushita shadow mask
Controls:	*Power switch and indicator*		√ front √	√ front √	√ front √
	Text mode/color		√ rear	—	—
	Brightness		√ front	√ front	√ front
	Contrast		√ front	√ front	√ front
	Vertical position		√ rear	√ rear (4 sets)	√ rear (2 sets)
	Vertical size		√ rear	√ rear (4 sets)	√ rear (2 sets)
	Horizontal position		√ rear	√ rear (4 sets)	√ rear (2 sets)
	Horizontal size		√ rear	√ rear (4 sets)	√ rear (2 sets)
	Degaussing		automatic	√ rear	automatic
	Other		vertical hold - front	—	loop through switches
					over/under scan
Image quality:	*Dot pitch*		.31 mm	.31 mm	.31 mm
	Glare resistance		3	4	4
	Ghosting/smearing/striping		none	faint striping	faint striping
	Flicker/jitter		jitter during disk access	0	occasional jitter
	Brightness continuity		OK	not OK	not OK
	Max. usable brightness		25.2 ft-L	16.1 ft-L	19.7 ft-L
	Moiré		1	1	1
	Linearity		3	2	3
	Pincushioning		0	0	1
	Shrinkage		1.3 %	.1 %	.7 %
	Sharpness		2	5	3
	Color quality		1	4	3
	Gray purity		1	4	2
Objective tests:	*Center misconvergence*		.2 mm	0 mm	.1 mm
	Corner misconvergence		.3 mm	.45 mm	.35 mm
	Gray linearity		62 %	60 %	38 %
	Gray impurity		100 %	57 %	3 %
	100% white chroma	*x*	.280	.326	.260
		y	.351	.329	.237
	white color temperature		7.9 K	5.8 K	greater than 15 K
	100% red chroma	*x*	.630	.639	.637
		y	.332	.322	.324
	100% green chroma	*x*	.299	.277	.276
		y	.590	.604	.602
	100% blue chroma	*x*	.142	.147	.150
		y	.058	.055	.054
Sharpness:	*Horizontal 1-pixel MTF*		40 %	30 %	30 %
	Vertical 1-pixel MTF		40 %	75 %	60 %
	Apparent misconvergence		mild H + V	mild V	none
	Dot-to-pixel ratio		1.3 : 1	2 : 1	1.3 : 1
	Vertical-line overlap		110 %	90 %	110 %
Video inputs:			TTL & Analog RGB	TTL & Analog RGB	TTL & Analog RGB
Resolution (ppi) as tested:			640 x 480 (68 ppi)	640 x 480 (44 ppi)	640 x 480 (61 ppi)
Maximum resolution:			800 x 560	1,024 x 512	720 x 540
Bandwidth:			30 MHz	35 MHz	30 MHz
Vertical scan (refresh) rate:			50 to 70 Hz (manual)	45 - 86 Hz	50 - 85 Hz
Horizontal scan rate:			15.5 - 35 kHz (automatic)	15 - 38 kHz	15 - 38 kHz
Cable length:			7 ft	5.5 ft	7 ft
Connector type:			detachable 9-pin D	detachable 9-pin D	detachable BNC
Documentation:			Thorough manual, 30 pp	(not received)	(not received)
Service and support:			Factory, or will send parts	Distributors (6 in U.S.)	Distributors (6 in U.S.)
Warranty info:			2 years	1 year	1 year
Price:	*Monitor*		$777	$2,895	$1,098
	Card		$648 (Apple)	$648 (Apple)	$648 (Apple)

E-MACHINES T16 Color Display System	*E-MACHINES TX Color Display System*	*E-MACHINES T19 Color Display System*	*MAGNAVOX MAC Color Display*	*MICROVITEC Definition*
16"	16"	19"	14"	19"
14 3/4"	15"	17"	12 3/4"	18 3/8"
11 3/4" x 8 7/8"	11 3/4" x 9 3/8"	13 3/8" x 10 1/4"	10 1/4" x 7 1/2"	14 3/4" x 11"
16" x 16" x 18"	16" x 15" x 17"	19" x 19" x 20"	14 1/8" x 13" x 15"	18 1/2" x 19 3/4" x 19 1/2"
59.4 lb (64.9 w/ stand)	64.9 lb	90 lb	25.7 lb	59 lb
288 w/out stand	288 w/out stand	380 w/out stand	212 w/out stand	361 w/out stand
175 watts	175 watts	220 watts	85 watts	100 watts
optional	optional	yes	yes	yes
silica coating	silica coating	OCLI	polished, darkened glass	polished, darkened glass
Sony Trinitron	Sony Trinitron	Sony Trinitron	Philips shadow mask	Toshiba shadow mask
√ front √	√ front √	√ front √	√ front √	√ rear √ front
—	—	—	—	—
—	—	—	√ front	√ front
√ front	√ front	√ front	√ front	√ front
√ front	√ front	√ front	√ front	√ front
—	—	—	—	√ front
—	—	—	√ front	√ front
—	—	—	—	√ front
automatic	automatic	automatic	automatic	√ front
H & V convergence	H & V convergence	H & V convergence	—	input selector
.26 mm	.26 mm	.31 mm	.29 mm	.31 mm
4	4	5	2	2
none	none	none	none	faint striping
none	none	none	none	constant jitter
slight problem	OK	OK	OK	not OK
17.3 ft-L	23.3 ft-L	36.8 ft-L	21.3 ft-L	16.9 ft-L
0	2	1	0	1
4	5	5	3	2
0	0	0	0	0
0 %	0 %	0 %	.8 %	1.8 %
5	4	4	4	4
5	5	4	5	3
5	5	5	3	3
0 mm	.1 mm	.1 mm	.15 mm	.3 mm
.3 mm	.1 mm	.2 mm	.3 mm	.65 mm
38 %	49 %	70 %	29 %	27 %
3 %	5 %	4 %	29 %	8 %
.272	.276	.283	.313	.279
.290	.272	.284	.330	.336
9.2 K	13 K	11 K	7.1 K	8.2 K
.630	.640	.639	.638	.627
.310	.314	.313	.318	.317
.275	.269	.269	.303	.305
.600	.593	.599	.599	.593
.122	.144	.144	.144	.144
.060	.059	.056	.049	.052
60 %	30 %	50 %	35 %	65 %
95 %	60 %	45 %	75 %	70 %
moderate H	none	none	mild H + V	mild H
1.5 : 1	1.2 : 1	1.1 : 1	1.5 : 1	2.0 : 1
90 %	110 %	120 %	110 %	90 %
Analog RGB	Analog RGB	Analog RGB	Analog RGB	TTL & Analog RGB
832 x 624 (71 ppi)	1,024 x 808 (87 ppi)	1,024 x 808 (72 ppi)	640 x 480 (62 ppi)	640 x 480 (43 ppi)
same as above	same as above	same as above	same as above	900 x 600
100 MHz	100 MHz	100 MHz	18 MHz	40 MHz
67 Hz	71.3 Hz	71.3 Hz	66.7 Hz	45 -100 Hz
45 kHz	62.24 kHz	62.24 kHz	35 kHz	15 - 36 kHz
6 ft	6 ft	6 ft	4.5 ft	6 ft
detachable BNC	detachable BNC	detachable BNC	attached 15-pin D	detachable 9-pin D
Good, complete, 33 pp	Good, complete, 33 pp	Good, complete, 33 pp	Still in production	Complete, 24 pp
Manufacturer	Manufacturer	Manufacturer	Regional cntrs. (6 in U.S.)	Distributor in Atlanta, GA
90 days	90 days	90 days	2 years	1 year
$3,295 includes card	$4,495 includes card	$5,995 includes card	$699	$2,395 (Mac II cable: $34.92)
$249 for tilt/swivel option	$249 for tilt/swivel option	—	$648 (Apple)	$648 (Apple)

			MITSUBISHI Diamond Scan	MITSUBISHI C6922	NEC MultiSync Plus
Screen size:			14"	19"	14"
Active screen:	*Diagonal*		11 3/4"	18"	11 1/4"
	Width x Height		9" x 7 1/2"	14 3/4" x 10 1/2"	9" x 6 3/4"
Case dimensions (W x H x D):			14" x 13" x 14 1/2"	19" x 17" x 19"	14" x 15" x 15 3/4"
Weight:			28.16 lb	62 lb	35.74 lb
Footprint (sq. in.):			203 w/out stand	361 w/out stand	221 w/out stand
Power consumption:			90 watts	120 watts	120 watts
Ergonomics:	*Tilt/swivel stand*		no	no	yes
	Glare treatment		etched, darkened glass	etched, darkened glass	etched, darkened glass
Tube manufacturer & type:			Mitsubishi shadow mask	Mitsubishi shadow mask	NEC shadow mask
Controls:	*Power switch and indicator*		√ front √	√ front √	√ front √
	Text mode/color		√ rear	—	√ front
	Brightness		√ front	√ front	√ front
	Contrast		√ front	√ front	√ front
	Vertical position		√ rear	internal	√ front
	Vertical size		√ rear	internal	√ front
	Horizontal position		√ rear	internal	√ front
	Horizontal size		√ rear	internal	√ front
	Degaussing		automatic	√ front	automatic
	Other		overscan/underscan		input - BNC/D-sub
			input selector, tint		
Image quality:	*Dot pitch*		.31 mm	.31 mm	.31 mm
	Glare resistance		4	4	4
	Ghosting/smearing/striping		none	slight ghosting	none
	Flicker/jitter		none	none	none
	Brightness continuity		OK	not OK	not OK
	Max. usable brightness		16.9 ft-L	24.7 ft-L	28.5 ft-L
	Moiré		1	2	0
	Linearity		3	3	4
	Pincushioning		2	1	0
	Shrinkage		1.7 %	.1 %	.3 %
	Sharpness		3	4	3
	Color quality		5	4	4
	Gray purity		4	4	5
Objective tests:	*Center misconvergence*		.15 mm	.1 mm	.2 mm
	Corner misconvergence		.4 mm	.25 mm	.4 mm
	Gray linearity		31 %	61 %	60 %
	Gray impurity		8 %	14 %	9 %
	100% white chroma	*x*	.280	.280	.288
		y	.313	.302	.301
	white color temperature		8.4 K	8.6 K	8.2 K
	100% red chroma	*x*	.654	N/A	.613
		y	.303	N/A	.312
	100% green chroma	*x*	.261	N/A	.311
		y	.615	N/A	.578
	100% blue chroma	*x*	.143	N/A	.145
		y	.053	N/A	.061
Sharpness:	*Horizontal 1-pixel MTF*		10 %	15 %	40 %
	Vertical 1-pixel MTF		75 %	60 %	70 %
	Apparent misconvergence		mild H	mild V	none
	Dot-to-pixel ratio		1.3 : 1	1.3 : 1	1.3 : 1
	Vertical-line overlap		100 %	120 %	110 %
Video inputs:			TTL & Analog RGB, NTSC	Analog RGB	TTL & Analog RGB
Resolution (ppi) as tested:			640 x 480 (71 ppi)	640 x 480 (43 ppi)	640 x 480 (71 ppi)
Maximum resolution:			800 x 560	same as above	960 x 720
Bandwidth:			30 MHz	50 MHz	55 MHz (BNC)
Vertical scan (refresh) rate:			45 - 75 Hz	40 - 70 Hz	56 - 80 Hz
Horizontal scan rate:			15.6 - 35 kHz	20 - 35 kHz	21.8 - 45 kHz
Cable length:			6 ft	6 ft	6 ft
Connector type:			detachable 25-pin D	detachable BNC	detachable 9-pin D
Documentation:			Good,14 pp, but no	Very technical,	Easy-to-read manual with
			warranty information	not for average user	illust. & tech. info, 25 pp
Service and support:			Distributors, or TRW	Distributors, or TRW	Auth. serv. cntrs.
Warranty info:			1 year	1 year	1 yr. labor, 2 yrs. parts
Price:	*Monitor*		$889 (Mac II cable $39)	$2,980 (Mac II cable $54)	$1,399 (Mac II cable $19.95)
	Card		$648 (Apple)	$648 (Apple)	$648 (Apple)

NEC MultiSync XL	*PCPC Trinitron Monitor II*	*PRINCETON Ultrasync*	*RADIUS GS/C Display*	*RASTEROPS Trinitron*
19"	19"	12"	19"	19"
15"	17 1/8"	11"	17 1/4"	17 7/8"
12" x 9"	13 3/4" x 10 1/4"	9" x 6 1/2"	13 3/4" x 10 1/2"	14 1/4" x 10 1/2"
19" x 18 1/2" x 21 1/4"	19" x 19" x 20"	12 1/2" x 12 1/2" x 14 1/4"	19" x 18 3/4" x 21"	19" x 17 1/2" x 20"
59.4 lb	90 lb	27.5 lb	79 lb (85 lb w/ stand)	79 lb
403 w/out, 144 w/ stand	380 w/out stand	178 w/out stand	399 w/out stand	399 w/out stand
130 watts	220 watts	85 watts	200 watts	220 watts
yes	yes	yes	yes	no
etched, darkened glass	OCLI	etched, darkened glass	OCLI	OCLI
NEC shadow mask	Sony Trinitron	JVC shadow mask	Sony Trinitron	Sony Trinitron
√ front √	√ front √	√ side √ front	√ front √	√ front √
√ front	—	√ side	—	—
√ front	—	√ side	—	—
√ front	√ front	√ side	√ front	√ front
√ front	√ front	√ rear	√ front	√ front
√ front	—	√ rear	—	—
√ front	—	√ rear	—	—
√ front	—	√ rear	—	—
√ right underside	automatic	automatic	automatic	automatic
input - BNC/D-sub	H & V convergence	16/64 colors for TTL, over/under scan	H & V convergence	H & V convergence
.31 mm	.31 mm	.28 mm	.31 mm	.31 mm
4	5	4	5	5
none	none	faint striping	none	none
none	mild/mild	jitter during disk access	none	slight
no	OK	not OK	OK	OK
39.8 ft-L	19.2 ft-L	22.6 ft-L	19.5 ft-L	22.6 ft-L
0	2	0	2	1
4	4 (slight bowing at top)	2	5	slight bowing at top
0	0	1	0	0
.2 %	0 %	1.3 %	0 %	0 %
4	4	3	4	4
4	5	3	5	4
5	5	2	3	4
.05 mm	.15 mm	.1 mm	.1 mm	.1 mm
.25 mm	.45 mm	.2 mm	.25 mm	.4 mm
100 %	19 %	56 %	47 %	84 %
5 %	6 %	35 %	23 %	6 %
.260	.281	.277	.285	.273
.289	.319	.275	.306	.286
9.7 K	8.3 K	9 K	8.3 K	9 K
.626	.640	.640	N/A	.642
.319	.315	.313	N/A	.313
.281	.270	.270	N/A	.268
.600	.604	.588	N/A	.590
.145	.145	.144	N/A	.145
.055	.058	.059	N/A	.059
25 %	55 %	10 %	45 %	40 %
95 %	75 %	50 %	70 %	35 %
mild H + V	mild H + V	mild H + V	none	large V / mild H
1.8 : 1	1.1 : 1	1.3 : 1	1.0 : 1	1.2 : 1
90 %	110 %	100 %	110 %	120 %
TTL & Analog RGB	Analog RGB	TTL & Analog RGB	Analog RGB	Analog RGB
640 x 480 (53 ppi)	1,024 x 768 (74 ppi)	640 x 480 (71 ppi)	1,152 x 882 (82 ppi)	1,024 x 768 (72 ppi)
1,024 x 768	same as above	800 x 600	same as above	same as above
65 MHz (BNC)	100 MHz	30 MHz	100 MHz	100 MHz
56 - 80 Hz	60 Hz	45 - 120 Hz	72 Hz	60 Hz
21.8 - 50 kHz	49 kHz	15 - 35 kHz	66 kHz	48 kHz
6 ft	5 ft	6 ft	6 ft	5 ft
detachable 9-pin D	detachable BNC	detachable 25-pin D	detachable BNC	detachable BNC
Easy-to-read manual with illust. & tech. info, 25 pp	(not received)	5 pp, Mac II instructions on tag attached to cable	Complete w/ illust. 29 pp	Complete 15 pp manual
Auth. serv. cntrs.	Factory, auth. repair cntrs.	Factory: NJ and So. CA	Dealers and phone support	Dealers and phone support
1 yr. labor, 2 yrs. parts	1 year	1 year	90 days	1 year monitor, 90 days card
$3,199 (Mac II cable $19.95)	$5,545 includes card	$849 (Mac II cable $19.95)	$4,295	$4,195
$648 (Apple)	—	$648 (Apple)	$1,895 ($6,190 total)	$3,495 ($7,690 total)

			RELISYS Multiscan	SONY CPD-1302 Multiscan	SUPERMAC 16" Trinitron
Screen size:			14"	13"	16"
Active screen:	*Diagonal*		12"	11 3/4"	14 5/8"
	Width x Height		9 3/4" x 7"	9 1/2" x 7"	11 3/4" x 8 3/4"
Case dimensions (W x H x D):			14 1/2" x 13 1/2" x 15 1/4"	14 1/2" x 12" x 15"	16" x 15" x 17"
Weight:			30 lb	32 lb	58 lb
Footprint (sq. in.):			221 w/out stand	218 w/out stand	272 w/out stand
Power consumption:			105 watts	96 watts	175 watts
Ergonomics:	*Tilt/swivel stand*		√	optional (see price below)	no
	Glare treatment		etched, darkened glass	etched, darkened glass	silica coating
Tube manufacturer & type:			NEC shadow mask	Sony Trinitron	Sony Trinitron
Controls:	*Power switch and indicator*		√ front √	√ side √ front	√ front √
	Text mode/color		√ side √ rear	—	—
	Brightness		√ side	√ side	—
	Contrast		√ side	√ side	√ front
	Vertical position		√ side	√ rear	√ front
	Vertical size		√ side	√ rear	—
	Horizontal position		√ side	√ rear	—
	Horizontal size		—	√ rear	—
	Degaussing		automatic	automatic	automatic
	Other		—	—	H & V convergence
Image quality:	*Dot pitch*		.31 mm	.26 mm	.26 mm
	Glare resistance		3	4	4
	Ghosting/smearing/striping		none	none	none
	Flicker/jitter		none	none	slight/none
	Brightness continuity		not OK	OK	OK
	Max. usable brightness		30 ft-L	22.9 ft-L	19.8 ft-L
	Moiré		1	0	2
	Linearity		3	2	5
	Pincushioning		0	2	0
	Shrinkage		1.0 %	.6 %	0 %
	Sharpness		3	5	3
	Color quality		4	5	4
	Gray purity		4	4	3
Objective tests:	*Center misconvergence*		.15 mm	.20 mm	0 mm
	Corner misconvergence		.25 mm	.15 mm	.3 mm
	Gray linearity		97 %	92 %	22 %
	Gray impurity		7 %	11 %	14 %
	100% white chroma	*x*	.286	.267	.281
		y	.301	.286	.317
	white color temperature		8.4 K	9.2 K	8.3 K
	100% red chroma	*x*	.618	N/A	.635
		y	.316	N/A	.314
	100% green chroma	*x*	.304	N/A	.268
		y	.585	N/A	.596
	100% blue chroma	*x*	.146	N/A	.144
		y	.064	N/A	.160
Sharpness:	*Horizontal 1-pixel MTF*		25 %	40 %	45 %
	Vertical 1-pixel MTF		50 %	55 %	80 %
	Apparent misconvergence		mild V	large V / mild H	large V / moderate H
	Dot-to-pixel ratio		1.9 : 1	1.5 : 1	1.2 : 1
	Vertical-line overlap		100 %	90 %	110 %
Video inputs:			TTL & Analog RGB	TTL & Analog RGB	Analog RGB
Resolution (ppi) as tested:			640 x 480 (66 ppi)	640 x 480 (67 ppi)	1,024 x 768 (86 ppi)
Maximum resolution:			800 x 560	900 x 560	same as above
Bandwidth:			30 MHz	25 MHz	100 MHz
Vertical scan (refresh) rate:			45 - 80 Hz	50 - 100 Hz	60 Hz
Horizontal scan rate:			15.5 - 35 kHz	15 - 34 kHz	48.78 kHz
Cable length:			6 ft	5 ft	4 ft
Connector type:			attached 9-pin D	detachable 9-pin D	detachable BNC
Documentation:			Complete, but no warranty information, 23 pp	Brief, no warranty information,12 pp	Complete, 31 pp
Service and support:			Factory and phone support	Serv. cntrs., phone support	Manufacturer, dealers
Warranty info:			2 years parts,15 mo. labor	1 yr. parts, 90 days labor	1 year
Price:	*Monitor*		$795 (Mac II cable $25)	$995	$4,395 includes card
	Card		$648 (Apple)	$648 (Apple)	

SUPERMAC 19" Trinitron	SUPERMAC Standard Color Monitor	TAXAN Ultra Vision 1000
19"	19"	19"
17 3/4"	16 3/4"	17 5/8"
14 1/4" x 10 1/2"	13 1/2" x 10"	14" x 10 3/4"
19" x 19" x 20"	19" x 16" x 20"	19" x 19" x 21"
79.2 lb	56 lb	77 lb
399 w/out stand	380 w/out stand	399 w/out stand
220 watts	150 watts	120 watts
yes	no	yes
OCLI	etched, darkened glass	OCLI
Sony Trinitron	Matsushita shadow mask	Mitsubishi shadow mask
√ front √	√ right side √	√ front √
—	—	—
—	√ right side	√ front
√ front	√ right side	√ front
√ front	—	√ drop-down panel
—	—	√ drop-down panel
—	—	√ drop-down panel
—	—	√ drop-down panel
automatic	automatic	√ right underside
H & V convergence	—	H-hold
.31 mm	.31 mm	.31 mm
5	4	5
none	none	none
constant flicker	slight jitter during disk access	none
OK	not OK	not OK
22.9 ft-L	30 ft-L	22.3 ft-L
1	1	1
5	5	4
0	0	1
0 %	0 %	1.6 %
4	3	4
5	5	5
5	5	4
0 mm	0.15 mm	.05 mm
.4 mm	.2 mm	.25 mm
51 %	95 %	8 %
1 %	9 %	2 %
.275	.279	.283
.285	.302	.311
9.1 K	8.5 K	9 K
.642	.631	.626
.313	.324	.328
.268	.280	.291
.586	.600	.566
.144	.148	.144
.057	.055	.058
55 %	40 %	30 %
65 %	30 %	40 %
none	mild H + V	mild V
1.1 : 1	1.2 : 1	1.2 : 1
110 %	110 %	110 %
Analog RGB	Analog RGB	Analog RGB
1,016 x 768 (72 ppi)	1,016 x 768 (76 ppi)	1,152 x 882 (82 ppi)
same as above	same as above	1,600 x 1,200
100 MHz	100 MHz	200 MHz
60 Hz	60 Hz	50 - 80 Hz
48.78 kHz	48.78 kHz	58-78, 48-53, 30-37 kHz
4 ft	4 ft	6 ft
detachable BNC	detachable BNC	detachable BNC
Complete, 31 pp	Complete, 31 pp	available soon
Manufacturer, dealers	Manufacturer, dealers	On-site service optional
1 year	1 year	1 year
$5,795 includes card	$4,795 includes card	$3,695
-		$1,895 (Radius Card)

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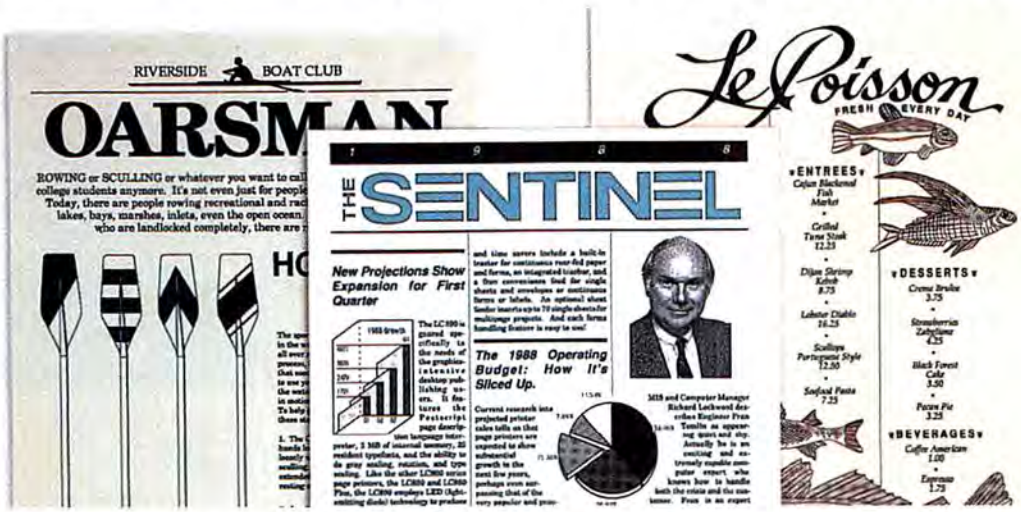
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EDITOR'S CHOICE

PC Week

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MACUSER'S
DESKTOP PUBLISHING SECTION

DTP

CONTENTS

Setting Up Shop
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DTP tips
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This month in DTP, we discuss what it takes to organize your own desktop publishing business.

There are also helpful tips for Microsoft Word, PageMaker, and Key Caps.

Elsewhere in this issue, you'll find coverage of color printers, a MacUser Labs report on color monitors, and a head-to-head review of FreeHand and Illustrator 88. If you need more space than a typical Mac screen offers, take a look at Stepping Out II in Quick Clicks. For capsule reviews of all DTP-related products, check out MiniFinders.

Maybe you have a few tips and tricks of your own you'd like to share. If so, send them to DTP, c/o *MacUser*, 950 Tower Lane, 18th floor, Foster City, CA 94404.

EDITED BY AILEEN ABERNATHY

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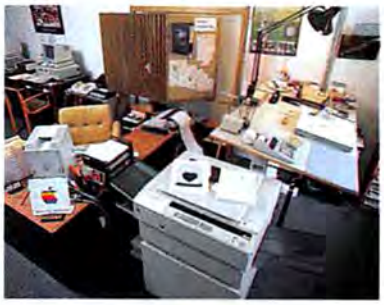
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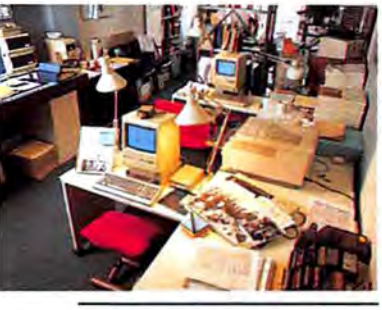
Shops like Utopian Technology feel that designing by Mac and by hand is an important combination.



Do you want people to work on a file simultaneously? If you're as ambitious as Mac Studio in San Francisco, networking may be for you.



One of the best ways to enhance an SE is to hook it up to a large-screen monitor as shown here at Mac Studio.



Shops like Mac Studio feel that the demand for high-resolution output doesn't justify the high cost of a Linotronic.

Setting Up Shop

With a little help from your friends — namely a Mac, software and some knowledge — you can open your own desktop publishing shop.

"He who first shortened the labor of typesetters and graphic artists by the device of Macintosh was disbanding hired armies. . . . He had invented the art of desktop publishing." (Apologies to Carlyle.)

Desktop publishing certainly has revolutionized the fields of typesetting and graphic arts. Those disbanded armies now have their own publishing houses. But what exactly do you need to become a desktop publisher? If you have a Mac, word processor, page-layout program, and printer, does that mean you're ready to open your own business? Perhaps, if you're only doing a few newsletters.

What training do you need to run your business? That depends on the type of services you want to offer. While there is no definitive formula for becoming a desktop publisher, here are a few suggestions on how to set up your own business.

You and Mac Against The World

In the beginning (say, two years ago), *desktop publishing* implied that one person could easily produce a publication or even start a document-processing business alone. And this was truly the case, as people discovered a real market in newsletter and brochure production. No more dealing with middlemen such as typesetters and printers: The desktop publisher became a one-man band. When it emerged as the buzzword in 1986, desktop publishing meant having a Mac and using PageMaker 1.2 to mix text and graphics. People set up shop in their own homes, producing newsletters, fliers, and other publications. Although this was not the most elegant means of publishing, it was a cheap way to circumvent the high costs of doing it commercially. Needless to say, this innovation did not meet with much enthusiasm from phototypesetters and printers.

Times have changed, and typesetters as well as printers now often see their businesses flourish when they take advantage of DTP technology. Desktop publishing has increased the quality of their work and allowed them to reduce prices. Desktop publishing, in turn, has broadened its horizons to include graphic design, color separations, and scanning.

Defining Your Business

As the technology becomes more sophisticated, the people who run these shops find new titles for their businesses and themselves. Shop owners want to avoid the term "desktop publishing" because it is associated with people working out of their homes.

Not to intimidate you prospective entrepreneurs, but many desktop publishing studios are owned and operated by printers and typesetters who have switched over to

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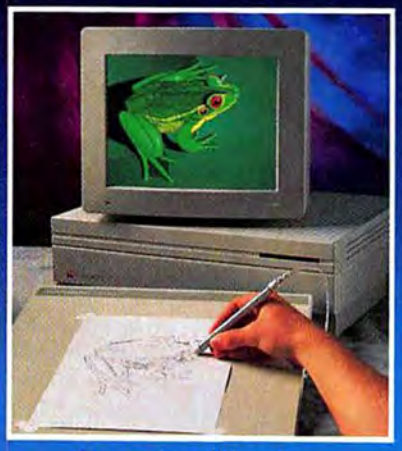
Desktop Publishing



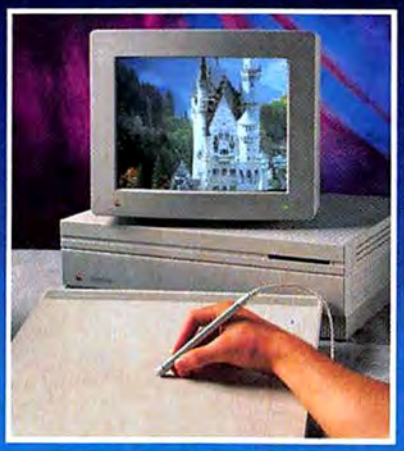
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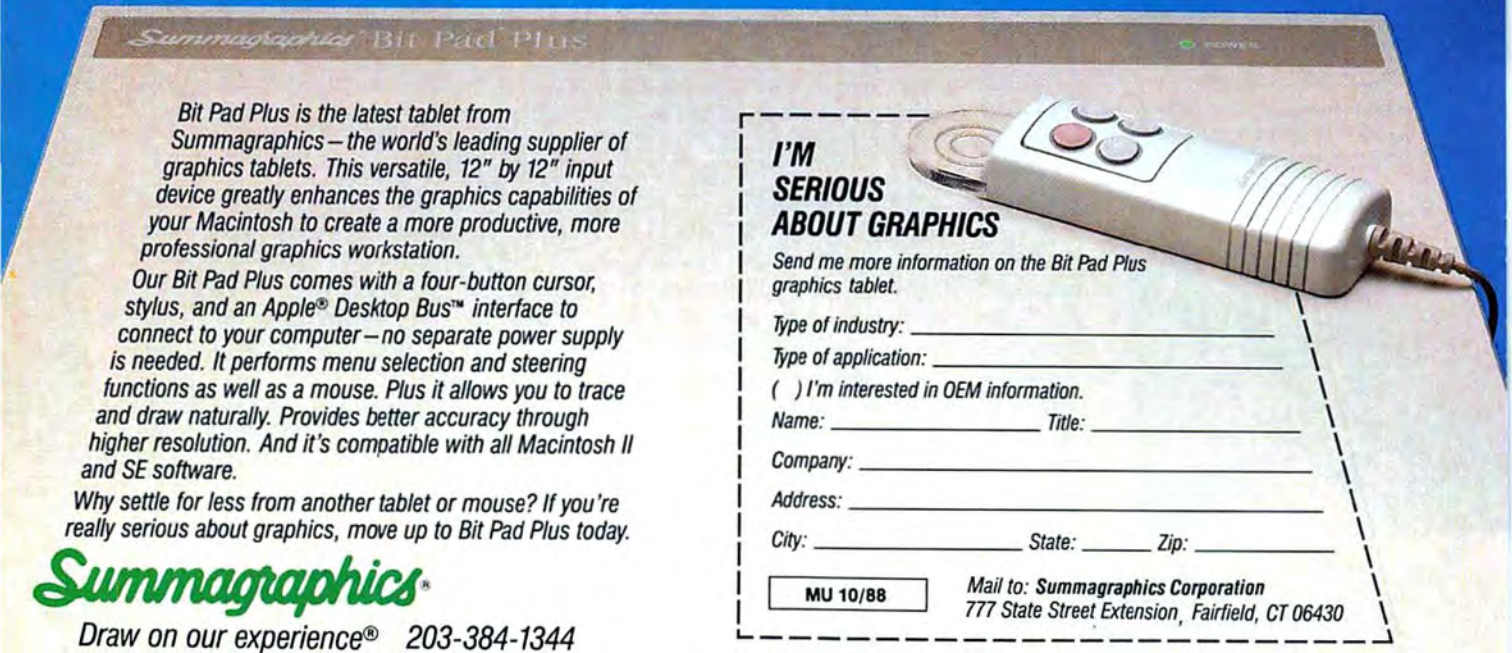


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Images courtesy of: Pagemaker from Aldus Publishing, VersaCAD, Powerpoint from Microsoft, PixelPaint from SuperMac Technologies, True Vision and Apple Computer, Inc.

Cricket to Sing Ragtime

MALVERN, PA — Cricket Software has signed an agreement with MacVonk of Zeist, Netherlands, to market Ragtime, the integrated spreadsheet and page-layout program formerly distributed in the U.S. through Orange Micro. Although the agreement is not final, Cricket expects the deal to be concluded by the end of the summer.

Rumors concerning the shifting of Ragtime's marketing from Orange Micro had circulated for several weeks, and at one time, Nashoba was mentioned as a prime candidate for the acquisition. Nashoba's preliminary discussions with Orange Micro were abruptly terminated, however, when Claris acquired Nashoba. See "News Line."

— Russell Ito

modern technology. These new businesses, no matter what the size, are commonly called service bureaus. Regardless of what you call them, the services offered by the bureaus are divided into two categories: shops that rent out hardware by the hour, so customers can create their own documents; and full-service shops, where the proprietor sells personal or corporate expertise in graphic design to customers who bring in their copy and art for a publication.

The Helpful Hardware Man

Renting time on Macs is commonplace in many copy shops. And on the surface, such businesses might seem trouble-free for the proprietors. After all, they are just renting Mac time to others. However, this assumes the customers are knowledgeable Mac and software users — which is often not the case. In other words, you must staff the place with helpful, Mac-literate employees if you want to be successful. Because your prospective customers will often rely on you to help with their projects, you and anyone you hire should be familiar with the page-layout programs, word processors, and graphics programs used in your shop. One of the biggest assets to your business — aside from the actual Macs — is to have at least one Mac mechanic. Should one of your machines malfunction, you have a person on the premises (perhaps yourself) who can repair it. Otherwise, you're at the mercy of your local dealer or other Mac fixer. This means you'll lose the use of a machine for at least a day or two, and if you only have two or three Macs, this will obviously cut down on business.

Shopping List

Getting started in this type of business involves at least four items: office space, computers, software, and a printer. If you want to entertain guests and save on rent, you could start the business out of your home. Otherwise, consider renting a small office to give yourself a choice in location and more working space. As for location, you're better off near a downtown area or in a college town. Look for the place where most of your customers will congregate. Corporations, other businesses, student publications, and campus organizations all produce newsletters, fliers, and other publications — and they're a rich source of business for you. The biggest expense is hardware. How many Macs should you have? How many laser printers? How fancy (i.e., expensive) should the printers be? Should you have a loaded Mac II, or are Pluses and SEs enough?

The answers will depend on your location. For example, if you're in or near a



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And That's Not All

OK, you've made the investments, hired a staff, and set up bookkeeping. You think you're set, but noooo. You've forgotten one thing: the taxman. The IRS needs to know your business exists, and if you don't tell them, they'll find out somehow. What follows are some federal tax guidelines for small businesses. Check with your local IRS offices for other federal laws and your state's requirements.

The three types of businesses, as defined by the IRS, are sole proprietorships, partnerships, and corporations. There's no single set of tax laws that covers all three, and different businesses pay different amounts of taxes on the same income. For example, sole proprietorships and partnerships don't pay corporate income taxes. Instead, the proprietor or the partners include their profits or losses on their personal income tax returns.

A prevailing notion in all IRS publications is that you should set up an extensive accounting system. This isn't too difficult with the abundance of good spreadsheet programs and accounting packages. You'll have to keep track of your expenses and profits, as well as salaries if you employ others. Be sure to record all transactions involving money and property, personal as well as business. And, of course, save receipts to keep track of your deductible expenses. Thorough rec-

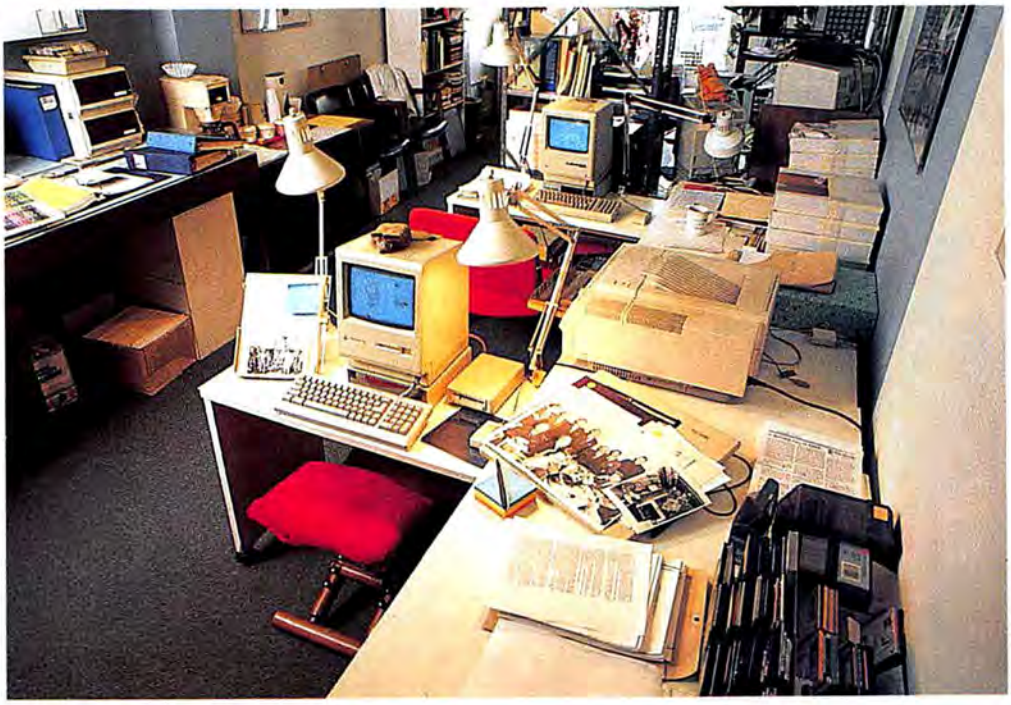
college town, expect a lot of evening walk-in business. You might make a living just from students working on term papers. Keep in mind that these configurations are merely suggestions; your situation and personal preferences are sure to differ. Simply due to its speed, the SE is the computer of choice. Its price ranges from $2,700 for one without an internal hard disk to $3,600 for one with a 20-megabyte internal hard disk. Shop around for the internal hard disk. You can get one for less money than you might think. If speed isn't important to you, then consider buying a Mac Plus, which sells for $1,700 or $1,800. Retail computer stores sometimes offer special package deals, such as a free word processor to go with the Mac. If you opt for an SE without an internal hard disk, you'll need an external one for each machine. Multiuser software isn't far off and reliable networking packages already exist, but reliability, performance, and licensing considerations make a hard disk for each machine the best way to go.

Once you have assembled your hardware package, purchase a page-layout program, word processor, and graphics program for each machine. Aside from the ethical considerations, which should be sufficient, using illegal copies to save a little money makes you an easy target for the software publishers' legal beagles. Also consider how you're going to keep your customers from walking off with copies of the software.

You're better off using programs that are familiar to most users. PageMaker (now version 3.0) is the most commonly used page-layout program and lists for $595. The current leader in word processing is Microsoft Word. Version 3.02 retails for $395. Finally, there's SuperPaint ($150) and MacDraw II ($395), enough graphics power for all but the most advanced users.

Initially, you should choose one program in each category. But eventually you'll want single copies of virtually all the software that your customers use. And I can't emphasize too strongly the need to obey license and copyright restrictions, even if you don't believe in them. The last thing your fledgling business needs is to become a legal test case.

Printing requires a laser printer — nothing else will do. Your customers won't be your customers for long if you don't offer laser-printing capabilities. You don't need a Linotronic, since most of your customers won't need such high-resolution output. However, these expensive printers can be addictive to users and profitable to you, so start saving your pennies. Prices start at $30,000 - $40,000 for a Linotronic 100 with PostScript.



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QMS introduces thousands of improvements to PostScript printing.



The new QMS ColorScript™ 100.

The world's first color PostScript printer.



PostScript printing is no longer simply a black-and-white issue. Thanks to the QMS ColorScript 100.

Now QMS has opened your projects to a range of new graphic possibilities using Adobe PostScript®, the industry-standard language of the desktop publishing revolution.

Now, your proposals, presentation graphics and publications can go from gray to glorious. Graphic design color schemes can change with just a single keystroke, not a hundred marker strokes. Even commercial printing proofs and in-house color separations can be produced and color-matched. All this will help save the two things every business needs. Time and money.

QMS worked closely with Adobe Systems, software developers and users to design the

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ColorScript 100. All agree it's a breakthrough. That's not surprising since QMS offers more PostScript products than anyone else.

The ColorScript 100 uses a revolutionary thermal transfer process that produces true 300x300-dpi resolution. That means you can generate thousands of brilliant colors with pinpoint registration that can match the color swatches scattered on this page.

The printer is built around an intelligent controller, running a 68020 processor, equivalent to the one in the Macintosh II. That makes it a powerful computer in its own right. A 16 MHz processing speed makes it responsive. Especially to things like deadlines. You can print an 8½"x11" page in just a single minute. An 11"x17" page in under two.

The system's large 8 megabyte memory can handle complex applications. And a 20 megabyte hard disk offers generous space for downloadable typefaces to complement its 35 resident Adobe typefaces.

Compatibility is also built in. The ColorScript 100 connects with Macintosh®, IBM®, Compaq® and other compatible PCs, along with minicomputers, workstations and mainframes.

That means you can work with Aldus FreeHand™, Micrografx Designer™, Quark XPress™, Adobe Illustrator 88™, AutoDesk AutoCAD® and most programs written under Microsoft® Windows. Plus all the new programs that are being developed to join dozens of other color-compatible applications.

The ColorScript 100 is yet another useful solution from QMS. Solutions that have made us a leader in print technology. That's one fact we don't mind giving you in black and white.

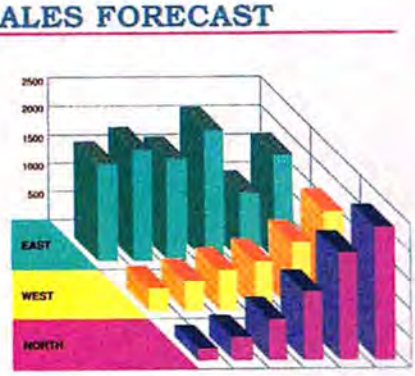
For information on the QMS ColorScript 100, including print samples, a complete list of compatible software and information on financing, call 1-800-631-2692, ext. 203.





Pictured are just some of the ways designers are using the QMS ColorScript 100. The creative director at one design firm notes: "We're doing comps in minutes that used to take hours. The quality is fantastic." A computer design system manager in the Midwest says: "Our clients are getting more options, in less time, at lower costs."





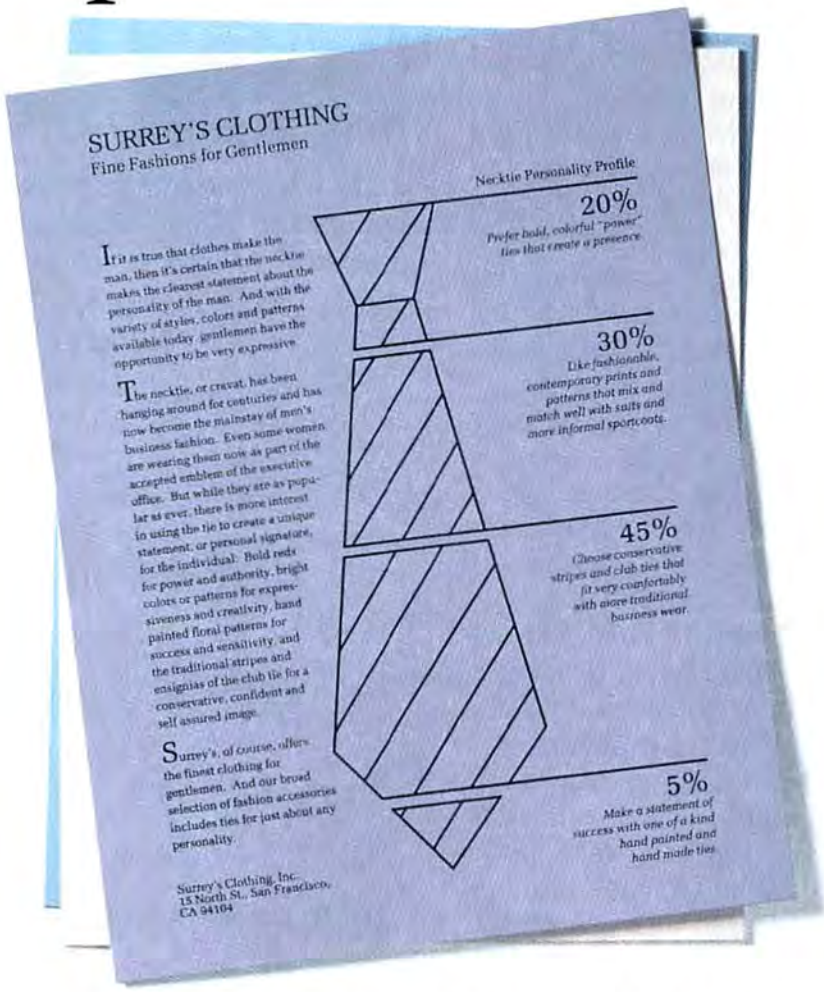
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ords will show when an asset was acquired, what it was used for, and if it was sold, traded, or destroyed. Having this information on file will help you take advantage of capital gain and loss laws.

If you employ others, you'll have to keep records that include information such as:

- **Each employee's name, address, and social security number.**
- **The amount, pay date, and period of time covered in each paycheck for an employee.**
- **The amount of withholding tax collected on each paycheck and the date.**
- **Citizenship records for each employee with special detail for nonresident aliens, residence in Puerto Rico or the Virgin Islands, or residence or physical presence in a foreign country.**
- **Withholding exemption forms (W-4 forms) from each employee.**
- **Any agreement you have with an employee regarding voluntary withholding of additional tax.**

These are just a few things to keep in mind. For more information, pick up a copy of the *Tax Guide for Small Businesses* free at your Post Office or library. You can also get one by contacting your local IRS office or by writing the U.S. Department of the Treasury.

Laser printers come in two varieties: PostScript printers and those that aren't. Go for PostScript compatibility. It costs more, but it's necessary when dealing with Macs. And go for speed. Get the fastest printer you can. Even with a spooler installed (more on that in a bit), the printer is where your operation is going to logjam. Always. A printer in the speed range required costs more than $5,000, even when discounted. If possible get two, since you're out of business if your only printer breaks down.

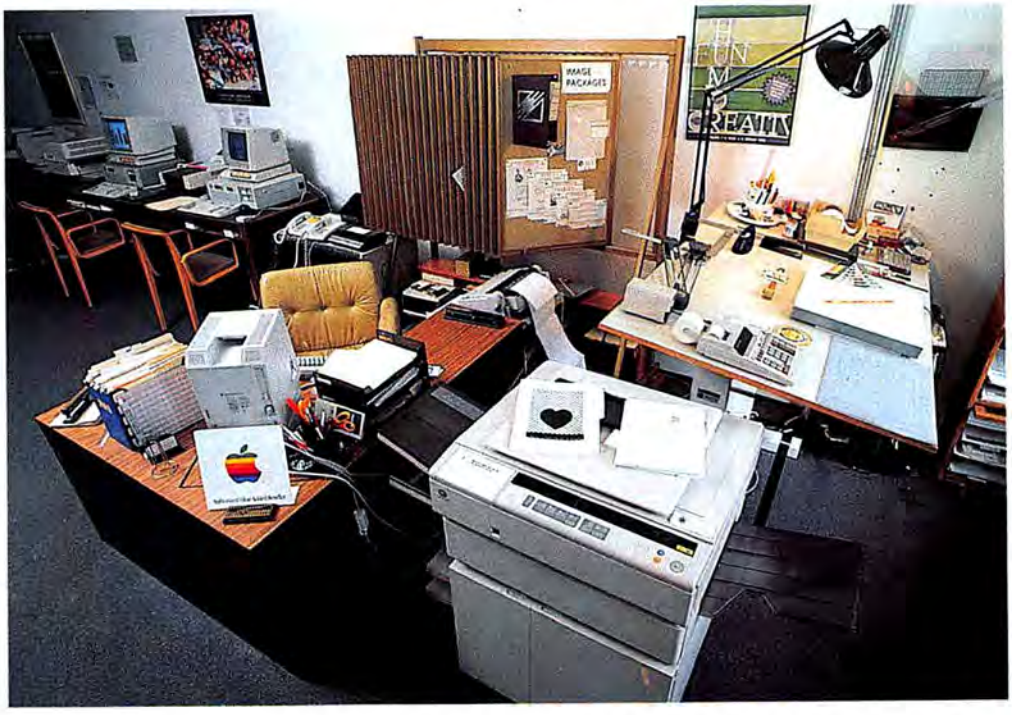
Remember to get the necessary cabling to hook the Macs and printers together. PhoneNET and LocalTalk are the choices, with PhoneNET being easier to hook up, cheaper, and more reliable. Apple manufactures and sells LocalTalk but uses PhoneNET in most of its offices. Enough said.

And don't forget spoolers. Without printer spooling, the Mac takes much longer to print, and if someone else is printing a job, your Mac is tied up until it gets its turn. Keeping customers sitting in front of (and paying the meter on) a Mac that's waiting to print is bad business. With a spooler, the job just goes to an intermediate storage location and waits in a queue to be printed. Spoolers make the printers (your most expensive piece of hardware) maximally productive.

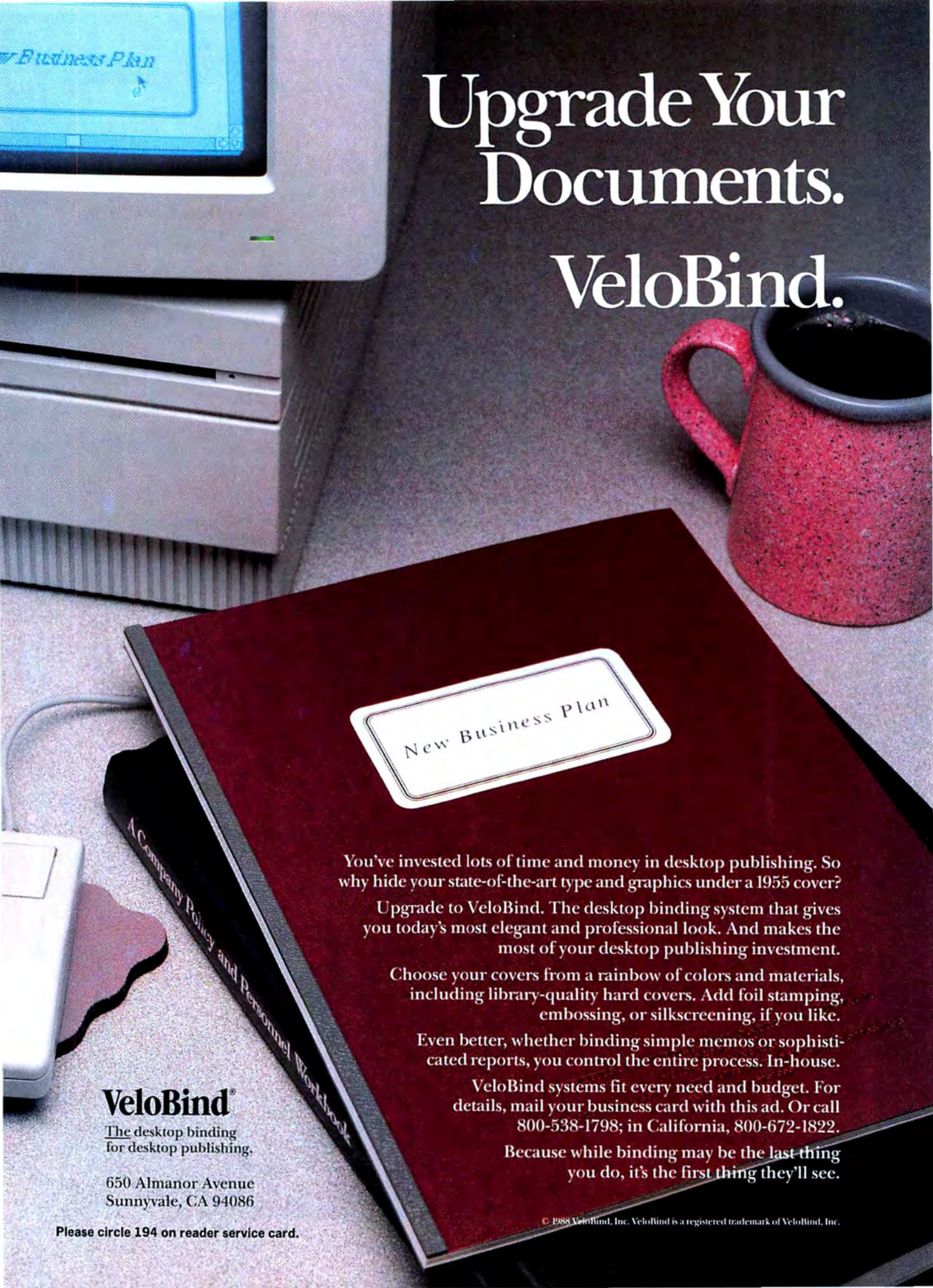
Spoolers also have two flavors: local and remote. Local spoolers are inside the Mac doing the printing. Remote spoolers are, well, remote. They collect print jobs from several machines at once and feed them to the printer one at a time. The best of the remotes, Apple's LaserShare, requires its own Mac and hard disk (a used Plus is more than enough here). But it's reliable and offers a Print Log feature that clearly indicates how many copies each machine has ordered printed. In addition, it indicates the time each print request was logged and also when it was printed. That's vital information if you plan on charging a per-page fee as well as a time fee (a common pricing structure).

What's It to You?

Having introduced the cast of characters, there's the small matter of deciding the worth of your services. In California, some service bureaus charge $6 to $8 per hour for work on any Mac. Others base their hourly rates on the specific machine in use. These prices range from $15 an hour for a Mac Plus to $20 an hour for an SE or Mac II. Printer output is priced by the page, 30 cents to $1 a page. Check over the prices of competing shops to gauge how much you should charge. To keep track of your earnings, you can use a spreadsheet program. Try Excel 1.5



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But Do They Do Windows?

Earlier this century, "full service" meant you could pull up to a gas station and, within seconds, two or three gentlemen would be pumping gas, cleaning the windows, and checking the oil. Today, you can toss out that notion, as far as gas stations are concerned. However, there are full-service desktop publishing bureaus. Although they don't check under your hood, they do design layouts and graphics, scan images, and more. The possibilities for these shops are endless; this could be your route to success. You might run a small operation where you work alone designing publications, or you could expand to include graphic design and scanning. Some shops specialize in Linotronic printing. Others mix a modern technology shop with the older pasteup shop.

Full-service bureaus are more labor-intensive than shops renting out hardware, and the labor is highly skilled. The number of employees you hire depends on the nature of your business. No matter what services you offer, you'll need one or two people who can service the machines. Unlike rental parlors, full-service bureaus don't require all of your employees to be Mac-literate. In fact, you should look for people who are qualified commercial graphic designers, and if they're up to speed on the Mac, all the better. If they're not, you or your resident Mac guru can teach them what they need to know about the machine and software. This is infinitely easier than teaching someone to be a graphic artist. You'll also want an office manager to schedule jobs, keep the books, and oversee operations. One person might handle all that, at least for a while. But in the long run, a full-service shop is a multiperson operation.

It's What You Have

Equipping a full-service bureau can be complicated and expensive. Again, we're simply offering suggestions based on shops we've visited. At the very least, you'll need a Mac Plus equipped with an external hard drive to handle small jobs. If you're just starting out and haven't purchased a Mac yet, or if you anticipate large, involved jobs, consider purchasing a Mac II. From the standpoint of graphic design, this is the machine to have simply because it can use a color monitor. But it is expensive, and it does take up a lot of table space, an important consideration if you have a small shop. The Mac II with an 800K floppy drive sells for $3,200 to $3,800. If you add a 45-megabyte internal hard disk, like one

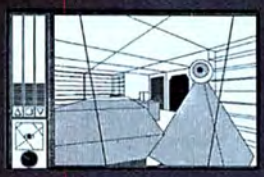


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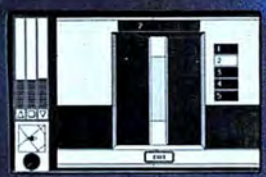
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Scanners are becoming part of the standard equipment in service bureaus because they are such timesavers.

from Rodime, add $1,600 to the price. On the other hand, if you already have an SE, you might look into upgrading. In fact, a good rule of thumb is to buy equipment with the idea that you will enhance or upgrade. For example, if you decide to go from an SE to a II, you'll want an internal hard disk that will transfer from one machine to the other and take the data with it. Newer versions of the Rodime drive, for example, can go along if you move from an SE to a II. The best way to enhance an SE is to add a large-screen monitor. (See the MacUser Labs Report on monochrome monitors, August '88.)

Another excellent enhancement is an accelerator card like those from Radius and SuperMac. The Radius 16-megahertz card costs $1,295 with a math coprocessor chip or $995 without. If you want more speed, you can use Radius' 25-megahertz accelerator card. With the math chip, this card sells for $2,195. Without it, the price goes down to $1,695. The SuperMac Speed Card doesn't pack as much punch as the Radius units (no Mac — of any ilk — is faster than an SE with the Radius 25-megahertz card). But you'll find it's vastly cheaper ($395 list).

You'll want a laser printer because most projects require this type of output. For projects that need a higher printing resolution than the 300 dots per inch (dpi) that most current laser printers deliver, consider doing what most service bureaus do: Farm it out to specialty shops that have Linotronic printers. Because full-service bureaus see such a small return on the investment with Linotronics, they make up a large portion of the client list for those printers who do specialize in Linotronic work.

With the standard equipment and highly skilled employees in place, what happens when someone brings in some graphic item that is not (horrors!) already in electronic form? Scan it, naturally. Scanners are gradually becoming part of the standard equipment in service bureaus because they are such timesavers. A four-bit scanner, the Data Copy Model 83, sells for $2,800. The difference among scanners is in the number of gray levels available. The Model 83 can handle 64 levels. For higher quality output, there is the Model 84. This eight-bit scanner, which lists at $6,800, can re-create 256 gray levels.

There's a closely allied technology called optical character recognition (OCR) that promises to make the scanning of text as easy as graphics scanning is now. However, OCR is still the exclusive province of specialists and experts. Try it at your own risk.

So you've got your page-layout program, such as QuarkXPress ($695) or



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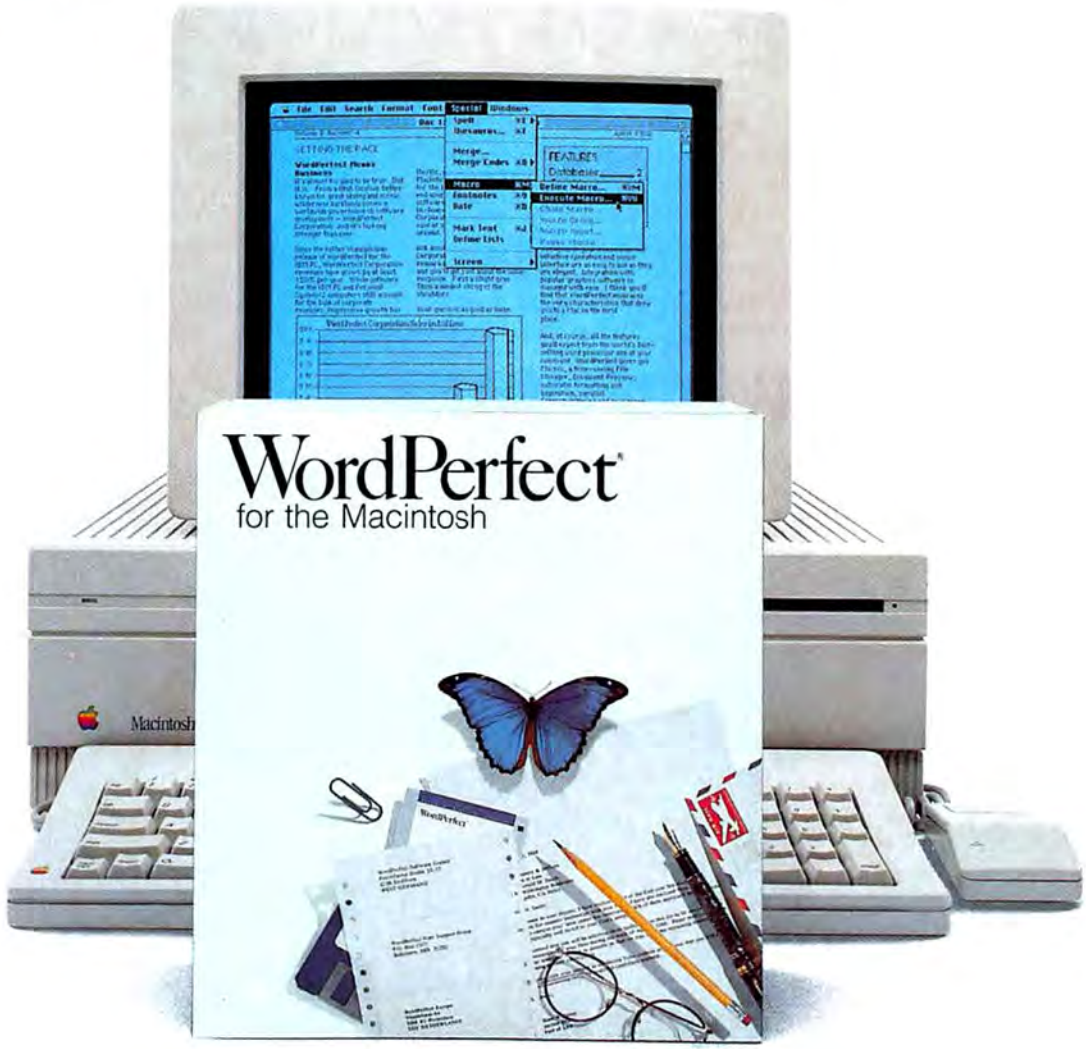
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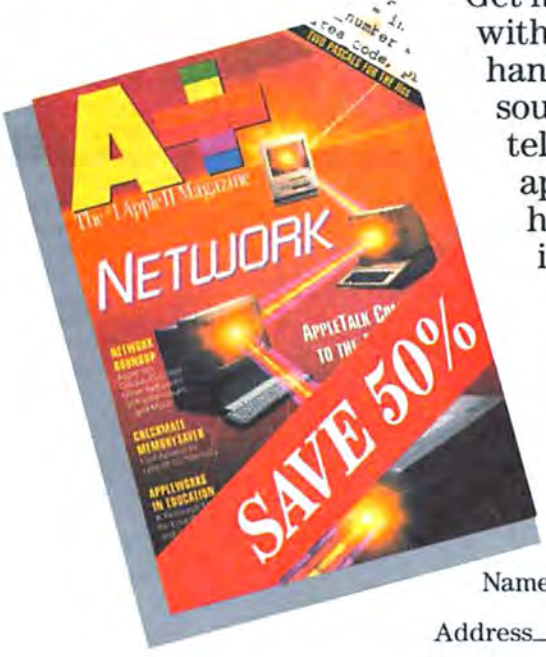
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The #1 Apple II Magazine

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In spite of what graphic designers may say, desktop publishing is for "the rest of us."

Ready,Set,Go! 4 ($495). And a word processor — maybe FullWrite Professional ($395), WordPerfect ($395), or Wordstar Mac (price not available at press time). What next? Well, you'll probably want more sophisticated graphics software to match the skills of your designers. FreeHand ($495) and Illustrator 88 ($495) are commonplace in service bureaus. For instances when you need to trace an image, you might want to have MacTablet ($495), a stylus-driven graphics tablet.

Little Shop of Macs?

IBM computers and their clones have found their place alongside the Mac in many full-service shops. And, like Jimmy Swaggart, they're just there to watch. Shop owners have found this genre of computers quite useful for storing files while the Macs do all the work. However, the PCs mere presence can open up your business still further. Customers can bring in a PC-formatted job, and you can read the files into your Mac using hardware like DaynaFiles, and software like MacLink Plus ($195) and translators ($159). If you're really ambitious, you could set up a networking system like the one from TOPS. However, you could be inviting trouble in regard to license and copyright restrictions from software companies. A system such as this should be used either for more than one person working on a file simultaneously or for the easy transfer of files, not for sharing software. Let the user beware. (For more information on Mac-PC connectivity, see the September '88 issue.)

Name Your Price

When deciding what to charge for your services, remember that you are selling your expertise and that of your staff. Also consider the level of equipment you use for a specific job. Perhaps you should charge more for projects you have to scan than for those brought in on-disk. If you do a job entirely on a Plus, you might charge less than if it involves an enhanced SE. Our survey in the San Francisco Bay Area reveals that proprietors charge $50 or more for individual projects and design. For typesetting and putting books together, prices usually run around $35 an hour. You'll have a better idea of what prices are competitive if you take the time to do some quick market research.

Things Mom Never Taught You

Although *Sunset* is the magazine for do-it-yourselfers, it won't ever do a series on how to design your own publication with a computer. However, learning about desktop publishing is easy. Companies like Tutorland offer "Teach Yourself" series for the more popular programs. This series, and others like it, comes with a training disk, but you must supply the application. Your local full-service bureau may be a great source of training. (Just don't tell them you're about to become a competitor.) You can also rent video tutor packages that demonstrate desktop publishing with the more commonly used programs. Of course, there's always hands-on training. Why not take that page-layout program you purchased and learn it on your own? A few hours spent using the program is probably as valuable and more effective than reading the manual. Besides, who in the Mac community reads documentation anyway? Many software companies realize this and include a help folder and tutorial with their program.

And in the End

In spite of what graphic designers may say, desktop publishing is for "the rest of us." It is a chance for you to break away from big publishing and printing houses and be on your own. In fact, desktop publishing would not have caught on so quickly, or at all, if it hadn't been for the one-man bands. These loners found a flourishing business in desktop publishing and began opening up design shops. Printers and typesetters converted to this movement when it became apparent that desktop publishing was the dominant modus operandi in the industry. To meet the demands of this fast-growing industry, more software companies began catering to the needs of the desktop publisher. For those graphic designers who feel that desktop publishing is only for highly trained professionals, you really have the "little guy" to thank for setting the technology in motion.

IN HER SPARE TIME, KRISTI COALE BACKMASKS BEATLES' RECORDS TO COME UP WITH OBSCURE HEADLINE REFERENCES. FOR EXAMPLE, THE ORIGINAL TITLE OF THIS ARTICLE WAS "SGT. PUBLISHER'S LONELY ARTS CLUB BAND." BEGRUDGINGLY, SHE IS ALLOWING MACUSER TO BREAK HER OF THIS HABIT.

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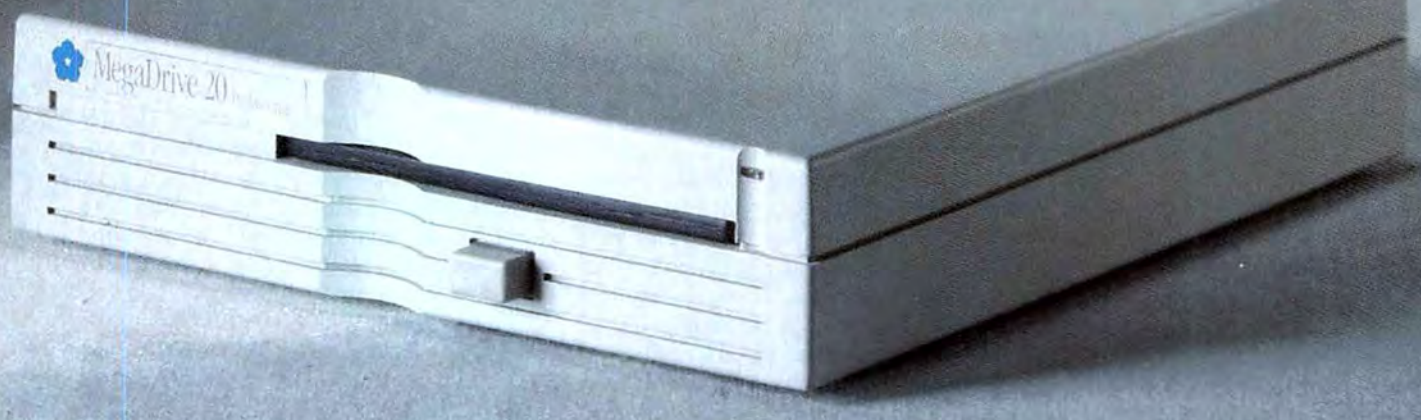
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BY GREGORY WASSON

KEY CAPS

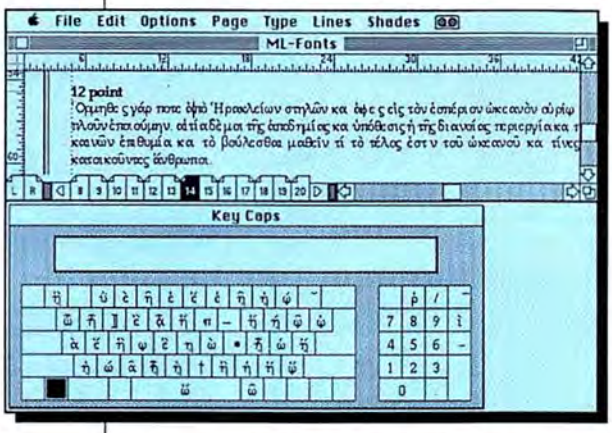


Figure 1: When working with a complex typeface such as Greek or with a symbol set like Zapf Dingbats, resizing the main program window and leaving the Key Caps DA open below it can prevent a lot of unnecessary hair-pulling by allowing you to see the keyboard layout all the time. And the Key Caps window always reflects changes brought about by Shift, Option, and Option-Shift even when it's not the active window.

WORD

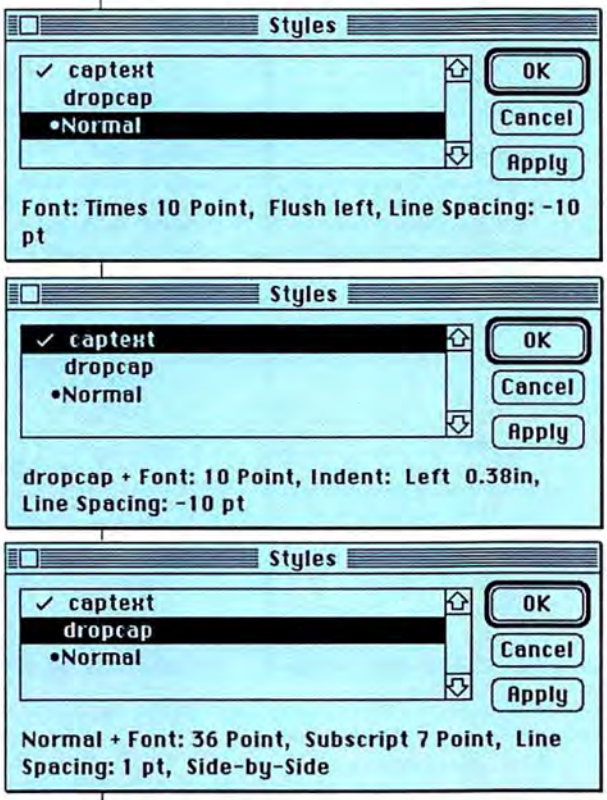


Figure 2: Even Word has its place in desktop publishing. Here is an example of the three styles that must be set up in Word to create drop caps.

PAGEMAKER

If the File Fits

Deleting big-memory items like EPS graphics from a PageMaker document doesn't necessarily decrease the size of the file. This is because PageMaker does mini-saves periodically (see page 1-34 of the 3.0 manual for details on when, if not necessarily why, the program does this).

Although it's mentioned in the manual, the following technique for compressing these inflated files to their smallest size is still not widely known. To compress an "inflated" file, simply perform a Save As at the end of any PageMaker session before closing the document. This will shrink the file by as much as 30 to 40 percent — a real boon since PageMaker jobs can be gargantuan to begin with. Using this procedure can make the difference between being able to back up a job to floppy or leaving it to the vagaries of your hard disk.

PAGEMAKER

Saving Specs

Changes made to PageMaker's Printer Setup specs are not saved if you simply open a file, make some changes to the specs, print the job, and then close it. If you want these changes to stick beyond the immediate session, make some simple change to the document, then immediately Undo it. For example, draw a box on the page with the box tool, and then choose Undo. Now any changes that you've made in the Printer Setup dialog box will be retained when you Save and Close the document.

WORD 3.0X

Dropping Caps

Although Word isn't particularly known for its DTP capabilities, it can be used in that arena — especially by exploiting its side-by-side paragraph feature. A nifty example of this is the creation of drop caps, enlarged capital letters that are inserted at the beginning of paragraphs.

The drop-caps effect requires three style sheets: 1) the normal style used for all body text below the drop cap; 2) a style for the text that lies next to the cap; and 3) the style for the drop cap itself. The latter two make use of side-by-side paragraphs to form the drop-cap effect. Figure 2 shows the settings necessary for each of these styles assuming that your basic typeface is Times.

The basic trick is to format the initial letter as a subscript *and* as a side-by-side para-

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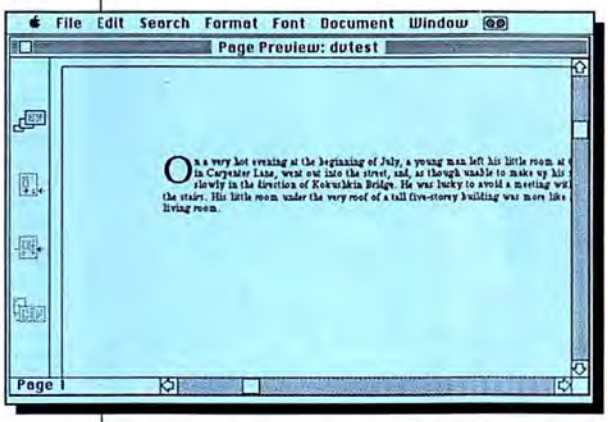
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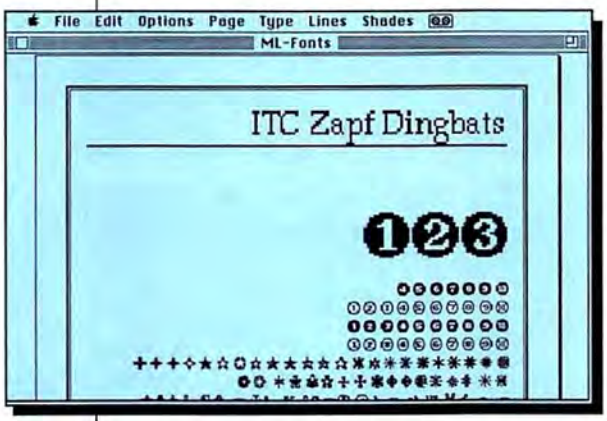
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WORD

Figure 3: **"Crime and Punishment" might be the best way to describe what a DTPer goes through when trying to create drop caps in Word, but it can be done. Here is the result in Word's Page Preview.**



WORD

Figure 4: **Creating a sample type sheet for clients is a snap using Word's Code command. *All* characters in the chosen typeface, even those without keyboard equivalents, can be obtained in the more logical ASCII order.**

graph. By changing the amount of subscripting, you can raise or lower the letter to your liking. Be sure to use a negative line spacing. If you just input a positive value for the line spacing, the program may increase the leading on its own. By putting in a negative value, you force the document to maintain the line spacing.

The text immediately to the right of the cap is also formatted as a side-by-side paragraph. You'll have to experiment a bit to find out where the last line of this section should break, since all text below the cap must be formatted in your normal style as an ordinary paragraph. In other words, although the printout and Page Preview view show all of this as one paragraph with a drop cap, you actually have three paragraphs.

It's not easy, it's not fun, but, hey, this is Word! Figure 3 shows the result in Word's Page Preview window.

WORD 3.0X

Codes of Characters

Professional desktop publishers or typesetters using DTP need to have sample type sheets for their clients that show *all* the characters available for any given typeface. Unfortunately, in the case of Adobe fonts, not all characters are directly accessible from the keyboard — even using the Shift, Option, and Shift-Option key combinations.

But you can access all characters through Word's Code command. Open up a new Word document. Choose the desired typeface from the Font menu and type Command-Option-Q. In the lower left corner of the window, where the page number usually appears, you'll see the word "Code." Enter the number 32 and hit return. When you press Return, the ASCII character represented by that code will appear at the insertion point. To get all the characters, repeat this process up to 255. Remember, you must type Command-Option-Q before each number to get the corresponding ASCII character.

The advantages to this procedure over simple keyboard entry are twofold: You can access *all* characters in the typeface whether or not they have keyboard equivalents; and you obtain the characters in ASCII order, which in the case of Symbol or Zapf Dingbats, is more logical (related characters are bunched together) than if you simply entered the characters in keyboard order.

Afterward, you can format and rearrange your page in Word or a page-layout program (see Figure 4) to create an attractive and informative type sheet for your clients.

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A/UXILIARY INFORMATION

Beauty and the Beast — the Mac married to UNIX. The Macintosh operating system has become famous largely because of its pioneering achievements in interfacing humans with computers. UNIX is a powerful multiuser, multitasking operating system that originally ran only on minicomputers. UNIX was written by and for programmers, and where the Mac is famous for ease of use, UNIX is equally renowned for being obscure and puzzling.

A/UX, Apple's implementation of UNIX, has the potential of combining the power of UNIX with the sophisticated interface of the Mac. Its initial release created a demand for the Macintosh II in traditional scientific and engineering markets where UNIX has long been a standard. As A/UX evolves and programs become available that better use the Mac interface, both the UNIX and Mac worlds may change in very exciting ways.

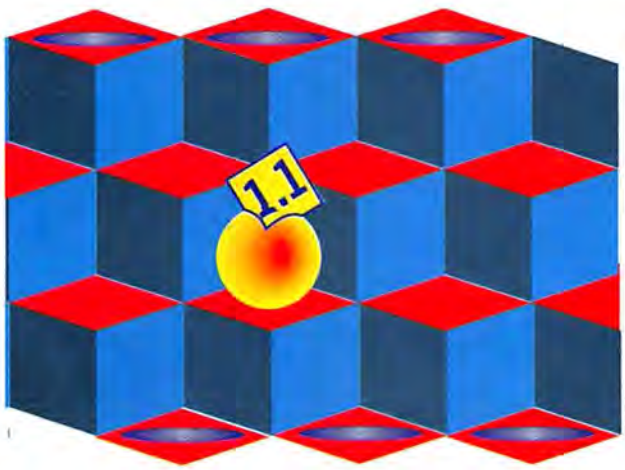
"A/UXiliary Information" will keep you informed about new products and developments in the A/UX community. As the role of A/UX evolves, so will our coverage, enabling the curious and the committed to explore this newest direction in the life of the Mac.

FILLING IN THE BLANKS IN A/UX

BY VANESSA SCHNATMEIER

The good news is that Release 1.1 of A/UX will probably be available shortly. Most Macintosh and UNIX developers would agree that news comes none too soon.

Despite Apple's assurances that 10 percent of Macintosh software would be able to run unchanged under A/UX, and that most of the rest would require only minor changes, the flow of A/UX software is still only a trickle. That's because the initial release of A/UX was lacking in several major respects, and those shortcomings severely handicapped product development, especially in the end-user software packages that Apple has specialized in for so long.



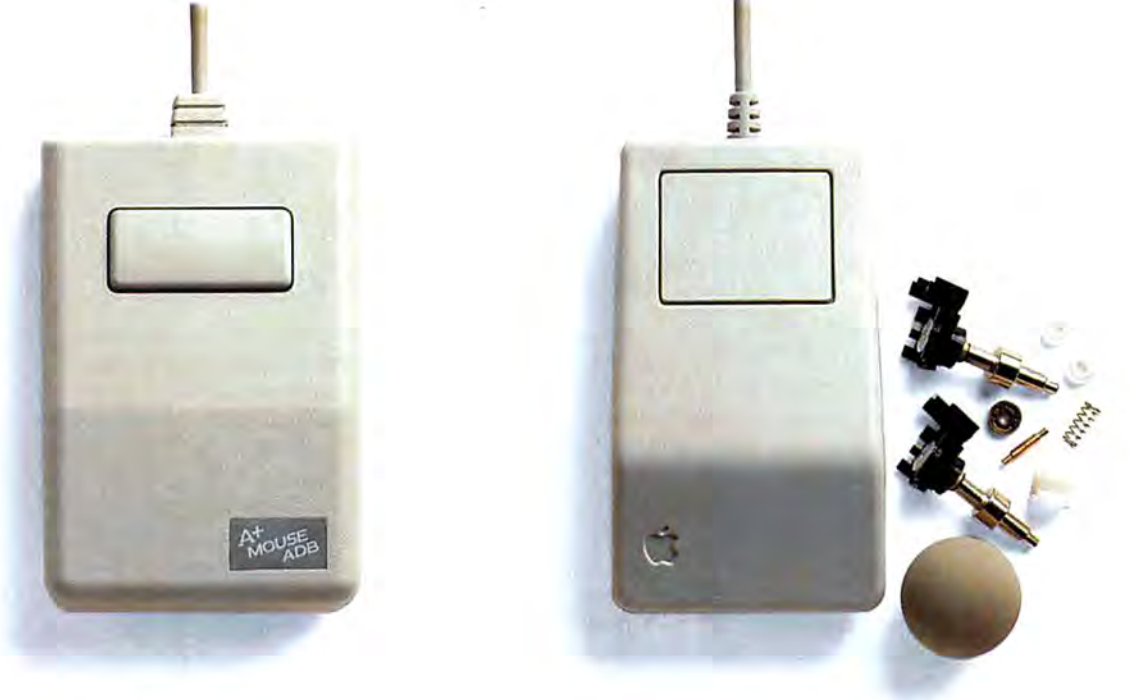
JACK J. MORTENSBAK

As a result, the company may have to revise its estimates of when A/UX will come into its own in scientific, engineering, and education markets.

Apple originally hoped that as much as one-fourth of its VAR channel would be given over to A/UX products next year. But red-faced Apple representatives admitted last summer that they missed their original goals with A/UX. Smita Deshpande, A/UX product marketing manager, said that Apple simply didn't realize how many applications bent the rules.

Companies that adhered strictly to the guidelines laid down in *Inside Macintosh* reported little or no trouble. Susan Beveridge, product planning technology manager at Informix Software (Menlo Park, CA), was porting manager for Informix's Wingz, a "WYSIWYG integrated spreadsheet" under development for the Mac OS. Beveridge found that if they followed the rules to a T, there were few problems porting to A/UX. Doug Edwards, executive director of brand marketing for Wingz, adds that the company's Wingz-A/UX team said the port was "a no-brainer."

Well, yes, said Stephen Hill, Informix's director of product marketing, there were almost no difficulties at all . . . except for that one minor prob-



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lem about how A/UX could read only 400K floppies.

That "minor problem" indicates just how many things were lacking from Release 1.0 of A/UX, and the floppy problem was the tip of the iceberg as far as developers were concerned.

Let's look at writing for A/UX as a developer might. A well-behaved Mac OS application can be launched under A/UX, so you may not need to rewrite your program at all. But if you want to use the A/UX process structure or other A/UX features that have no equivalent in the Mac OS, you need to fully port the application. What then?

First, your software must be written in the right language. According to one developer, if you have software in the Mac OS world and you want to port it to A/UX, the software must be written in C because, at this writing, there are no Pascal compilers available for A/UX.

Fine, your software is written in C. Then you open the A/UX documentation and glance at the page that lists the Mac OS functions supported under A/UX. Chapter 4, page 68 is somewhat sobering. Macintosh tools that are not available in Release 1.0 include:

- The palette manager
- The printing manager
- The script manager
- The SCSI manager
- The serial driver
- The slot manager
- The sound manager
- Video drivers

AppleTalk is not supported in Release 1.0. The A/UX toolbox provides less accurate implementation of the standard Macintosh time manager. A/UX has "partial implementation" of the Macintosh hierarchical file system.

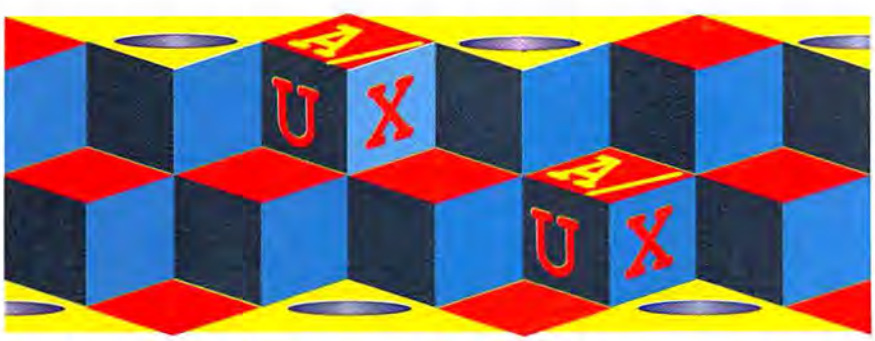
Whew. Sort of takes the wind out of your sails, doesn't it? In particular, the absence of the printing manager and the sound manager have hamstrung several developers.

To give Apple credit, it reportedly plans to brick up many of the biggest holes with Release 1.1. The next release of A/UX will definitely, according to several sources, support color, read double-sided disks, and provide a printing manager; several of the other gaps listed above also will be closed.

Developers have encountered some subtler problems, though. Rusty Rahm, president of StarNine, an A/UX software development house in Berkeley, CA, points out that in Release 1.0 it isn't possible to create Desk Accessories. That's because of the differences in UNIX and Macintosh memory structures.

Another sticking point for A/UX is that the Macintosh Programmer's Workshop tools don't run under the new operating system. The Mac tools for creating dialogues and adding fonts don't exist yet under A/UX, except for a few relatively primitive capabilities — this hinders Mac developers much more than UNIX developers porting to A/UX. Apple has yet to make a commitment to bringing over MPW tools, but then, the company probably figures that its efforts would be better spent shoring up the Mac OS for A/UX.

Apple has been burned too often by unavailable software to let the gaps in A/UX remain unfilled. Filling those gaps may solve the immediate difficulties for developers. But even if those gaps are filled, Apple will have to scramble to make up for lost time in bringing UNIX products to the Mac II.



JACK J. MORTENSBAK

What's New for A/UX?

StarNine is doing its part to shore up the gaps in A/UX Release 1.0 with a package called StarNine Utilities. This package includes six Macintosh-like functions:

1) A/UX <<=>> MAC — This A/UX to HFS direct file-transfer utility will copy to and from A/UX and your Mac and A/UX volumes using a simple copy dialogue that looks like a Font/DA Mover. The utility also lets you launch Mac OS programs, and an optional watchdog timer returns control to you if there is any difficulty in launching the Macintosh application.

2) AUDIT system — This check system serves as a sort of visual front end to A/UX autorecover. Working with configuration management list (CML) files, AUDIT shows you what autorecover would do if you ran it, and gives you selective control over its functions.

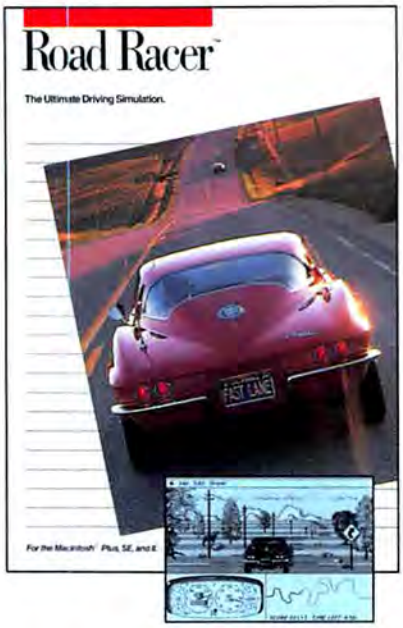
3) Disk Admin — A program that lets you view your SCSI hard disk partitions graphically.

4) Ramdisk — A RAMDISK driver and configuration utilities that reportedly boost the performance of the Apple 80-megabyte hard disk tenfold.

5) Screensaver — This utility blackens the monitor and displays a floating icon.

6) Snapshot — A utility that captures an A/UX screen to be viewed, to be saved as a MacPaint file (or in a compressed format, which, unlike MacPaint files, can accommodate any screen size), or to be sent directly to a printer. Snapshots can also be taken of Macintosh applications running under A/UX using StarNine's improved version of the launch command.

List price for StarNine Utilities is $99; site licensing is available, and universities receive a 20 percent discount.



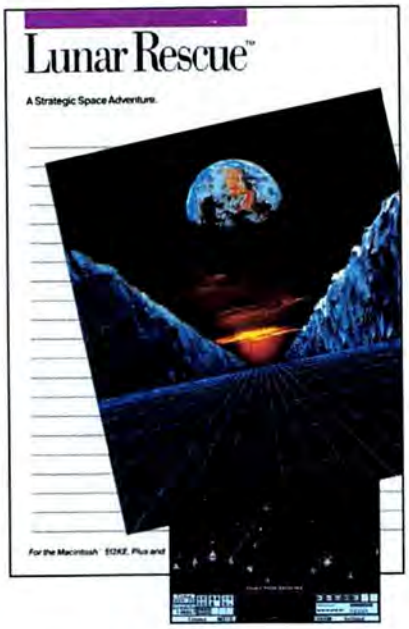
Speed limit 200. Strap yourself in for the ride of your life.

Road Racer's detailed graphics and digitized sounds simulate driving conditions in 5 environments ranging from high-speed desert flats to twisting mountain roads. So convincing you'll actually find yourself trying to look over the hills and around the turns.

The trees, rocks, telephone poles, and other graphics fly past your 1965 Corvette at breakneck speeds. Hear its thundering 350-horsepower engine and screaming tires as you corner around wicked curves.

Steer and accelerate with the mouse, and use your keyboard for brakes and shifting.

Each level is tougher than the last with unpredictable road hazards and many courses to travel. You score points for fast, skillful driving. Road Racer is high performance you won't forget.



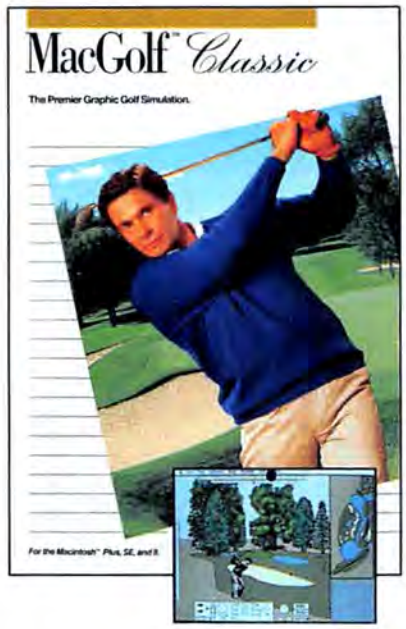
Watch out! ... SMASH! ... A heat-seeking missile has just slammed into your ship.

The year is 2059. Raiders have stolen five controlling crystals that maintain the defense and supply network for the moon's 26 cities. With key commodities cut off, the cities are doomed.

Your mission is to recover the fiendishly hidden crystals while transporting vitally needed goods between cities. Traverse dangerous terrain and combat relentless attacks with your arsenal of lasers, cannons, bombs and shields.

Prepare yourself for an odyssey of furious action and strategic high stakes trading.

Lunar Rescue is an addictive adventure that challenges your imagination and sets your adrenaline on fire.



A premium edition of the best selling Macintosh game in the world.

MacGolf Classic puts you into a full perspective 3-D simulation of realistic golf action. You match your skills against fairways, roughs, sand traps, water hazards and trees.

MacGolf's two courses are together with the four MacCourses,™ for a total of 108 holes, all in vivid full screen color on the Macintosh II.

MacGolf Classic gives you a player's eye view and an aerial overview of each hole with close up options. You have complete control of your position, ball placement, ball speed and direction, and selection of all 14 clubs. Spectacular digitized graphics and sounds add to the excitement.

MacGolf Classic is so close to the real thing it will improve your golf game. Every challenge should be this spectacular.

PCAI™

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A/UXiliary Information

By the time you read this, StarNine should also be shipping its own version of TOPS for A/UX. This version is a networking package that allows Macintosh and IBM PC users to share files with and run applications residing on a Mac II running A/UX. Using TOPS, the Mac II under A/UX can function as a server to the Mac and PC network. TOPS uses the AppleDouble format, so that Mac applications can be run over the network or by the A/UX server.

The product can serve as a gateway for NFS (Network File System from Sun Microsystems in Mountain View, CA), which means that Mac and PC users can mount volumes from vendors who support the NFS standard. For a one-to-four user license, TOPS lists at $895; for five or more, the price is $1,495. For more information, contact Elizabeth McGee, Vice-president of Sales and Marketing, at StarNine, 2124 Kittredge #48, Berkeley, CA 94704 (415) 451-9789.

Another of A/UX's weak spots, real-time processing, has been attacked by Golden Triangle Computers (San Diego, CA) with its product FirePower, a real-time processor board that fits into a NuBus card slot.

FirePower makes distributed real-time processing capability accessible from A/UX. The board is a NuBus master/slave with a 68020 processor, an optional 68881 floating-point unit, up to 4 megabytes of DRAM, two Apple-Talk compatible serial ports, and a SCSI interface that reportedly performs five times faster than the SCSI interface on the Macintosh II.

FirePower's real-time operating system, GT/X, is tightly coupled with A/UX, making it possible to develop and use real-time applications. A/UX or other UNIX processes communicate transparently with GT/X applications using TCP/IP over NuBus or Ethernet. The product is available with a 16-megahertz, 20-megahertz, or 25-megahertz 68020, and is available in reseller's volume price at $2,500. For more information, contact Golden Triangle Computers at 4849 Ronson Court, Suite 206, San Diego, CA 92111; (619) 279-2100.

The Classic Returns!



Quoted by industry experts, passed around in user groups, and relied upon by everyday Mac users, THE APPLE MACINTOSH BOOK is the bible of the Mac world. Now, it's thoroughly updated with the latest on new and emerging Mac products. If you just bought a Mac or are thinking of upgrading, don't miss this book. Cary Lu explores:

- how the Mac works: its video screen, keyboard and mouse, disks and disk drives, data pathways and memory, and printers
- what's currently and soon-to-be available in word processing, graphics, business software, communications, networking, and desktop publishing for the Mac
- how to manage disks with available memory and what options exist for mass storage
- what programming languages exist

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TIP SHEET

COMPILED BY GREGORY WASSON

Found a trick, short cut, or smarter way to get something done with a program? Share your hints by sending them to The Tip Sheet, c/o *MacUser*, 950 Tower Lane, 18th floor, Foster City, CA 94404. We pay at least $25 for every hint we publish, plus we'll print your name and hometown.

Every month we'll select one tip as the Tip of the Month. The person who sends in that tip will receive $100 for it.

WORD 3.02

When you renumber an outline in Word 3.01, any entries that began with a number (a date, for example) get renumbered as well. This nice outline, for example,

Introduction
The historical perspective
1968 — Ajax Frizbott Co. founded
1975 — Purchased by Ace Frizbotts Interl.
1988 — Merged with Frizbotts R Us

becomes:

1. Introduction
1. The historical perspective
1 — Ajax Frizbott Co. founded
2 — Purchased by Ace Frizbotts Interl.
3 — Merged with Frizbotts R Us

To avoid this, choose Styles to set the font for your various outline levels to Palencia or some other font that doesn't use the □ (Option-H) symbol. Every time you type a number to start an entry in the outline mode (which, as you may recall, always displays in Geneva), precede the number with □ (Option-H). When you renumber and leave the outlining window, the □ characters will disappear. You don't have to use Option-H, of course. Just pick an Option-key combination that's blank in the font you've chosen.

Doing this will allow your outline to print without losing any of the data/text:

1. Introduction
1. The historical perspective
1 1968 — Ajax Frizbott Co. founded
2 1975 — Purchased by Ace Frizbotts Interl.
3 1988 — Merged with Frizbotts R Us

JON H. CLINCH
HATFIELD, PA

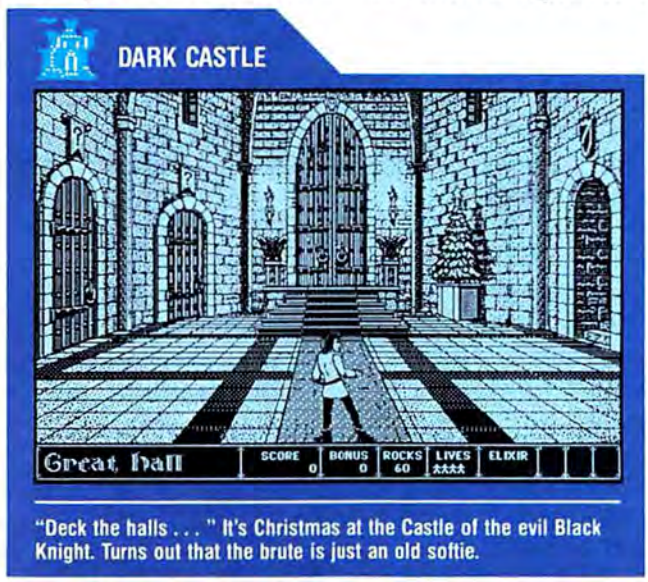
In Word 3.0x's Save As dialog box you can use keyboard shortcuts instead of clicking with the mouse on the usual buttons. Press Command-S for Save, Command-E for Eject, Command-C for Cancel, and Command-D for Drive. This feature is particularly convenient for switching between drives when searching for documents. The same technique works in the Delete dialog box, except that Command-S activates the Delete command.

JOHN FOUNTAIN
CHRISTCHURCH,
NEW ZEALAND

Users of Word 3.01 and the new Apple LaserWriter II SC will probably run into problems. Trying to print justified text results in ragged-right output. Version 3.02 is supposed to correct the problem but creates some more of its own. When you open a document in Word 3.02 and try any procedure that requires pagination, you will bomb out!

To correct this, you must select the LaserWriter II SC driver using the Chooser each time you open the application (even though the LaserWriter II SC driver is the only one in the System folder and you had chosen it while in the Finder or another application). You only have to choose the LaserWriter II SC driver once — when you open Word 3.02. As long as you stay in Word, you can open any document you wish or start new ones without encountering any problems.

MEL C. LABRADOR
ANN ARBOR, MI



"Deck the halls . . . " It's Christmas at the Castle of the evil Black Knight. Turns out that the brute is just an old softie.

DARK CASTLE

Here's an interesting bit of trivia concerning the game Dark Castle. The Black Knight isn't such a mean fellow after all. Use the Alarm Clock DA or the Control Panel to set the date to December 25, then start up the game. It appears that the Knight isn't as much of a Scrooge as you might have thought.

K. L. JUNCK
ANN ARBOR, MI
BYRON CALHOUN
MCLEAN, VA

HYPERCARD

Here's a tip on how to use a lot of different sounds in HyperCard without using too much disk space. Use Font/DA Juggler Plus. First, use the Fkey/Sound mover, included with Font/DA Juggler, to create the sound files. Hold down the Option key while opening files to open a HyperCard

Develop your ideas in Digital Darkroom.



1 *A classic arch becomes the anchor for this surreal composition. After eliminating unwanted areas, a stair-step design is added.*

2 *After being cut from its background, a skyscraper is added. A false bottom is created with simple retouching.*

3 *With the help of automated paste controls that replace tedious pixel editing, the waves wrap around the arch.*

4 *Using brightness and contrast controls, dramatic clouds are salvaged from an underexposed original and then pasted into the background.*

5 *Finally, the children step out of an otherwise ordinary photo — with the help of the Magic Wand automatic selection tool — to add the key dramatic element to the composition.*

Imagine a computerized darkroom...in your Macintosh.® Software that gives you more control over grayscale images than even the most skilled photographer. That's Digital Darkroom.™

Unique "intelligent" tools eliminate much of the work in creating dramatic compositions, whether you're a beginner or a professional. You can automatically select objects using the Magic Wand, or blend one image into another with simple slider controls. You can freely slant, stretch or rotate your image to get precisely what you want.

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And when it's just right on-screen, the exclusive Advanced Halftone printing option will give you the smoothest grays and sharpest detail you've ever seen on a 300 dpi laser printer — even on non-PostScript® language printers.

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Special introductory price: $295.

System requirements:
Macintosh Plus, SE or Macintosh II

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SILICON BEACH
SOFTWARE

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stack. Then create new Fkey/Sound mover files, and copy the HyperCard sounds to the new files. Font/DA Juggler Plus can open these new Sound files at any time. Up to 12 sound files can be opened. The only limitation on the number of sounds is disk space. You can switch sets of sounds quickly and easily.

One problem: HyperCard can play only HyperCard sound resources. The Mac II beep sounds that came with Font/DA Juggler Plus cannot be played in HyperCard.

ADAM E. EK
LEE, ME



In the January '88 *MacUser* Tip Sheet, a HyperCard tip says that pressing the Command and Option keys simultaneously will outline all buttons, including hidden and concealed buttons. Hidden buttons, however, are only outlined in Button mode — other buttons will be shown in Button *and* Browse modes.

While in Field mode, you can outline *all* fields, whether hidden or not, by pressing the Command, Option, and Shift keys simultaneously. This is very useful when learning programming techniques from other stacks.

ALISON MOORE-SMITH
PROVO, UT

[*Version 1.2 has a command to show all buttons — Ed.*]

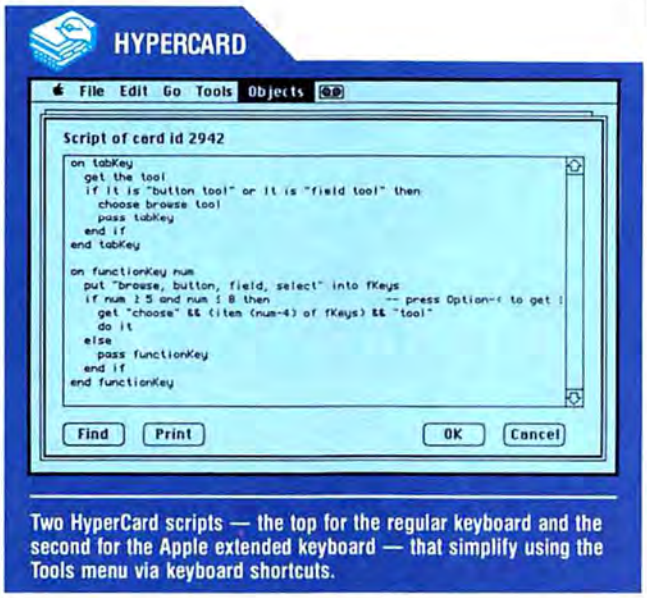


When you're authoring HyperCard stacks on an SE, you don't always have a convenient spot to stash the tools menu. You can hit the Tab key to go from button or field mode to browse mode, but this has the sometimes undesirable side effect of selecting the first unlocked field. The contents of fields can be lost this way. This can be avoided by adding the top group of lines in the illustration to the Home Stack.

And if you have the extended keyboard, you can change tools by using the function keys. Put the second group of lines from the illustration into the Home Stack:

Don't use F1 through F4, since these are reserved for Undo/Cut/Copy/Paste.

ERIC PROMISLOW
OTTAWA, CANADA



Two HyperCard scripts — the top for the regular keyboard and the second for the Apple extended keyboard — that simplify using the Tools menu via keyboard shortcuts.

HYPERCARD REPORTS



While using HyperCard Reports (by Mediagenic née Activision), you can encounter an unusual problem.

In the HyperCard script editor, using the Tab key simply realigns the indentation in the script. However, when using HyperCard Reports' script editor, pressing the Tab key actually inserts some character (probably a tab character) that shows up as white space. When the script is executed, HyperCard cannot interpret the added character and this results in a "can't understand" error. To fix it, you must delete the added character. So don't use the Tab key in HyperCard Reports' script editor.

SAMUEL M. SMITH
PROVO, UT

SUPERPAINT



It's possible to enlarge any selection in SuperPaint to page size or any size that you want. First, use the lasso or marquee tool to select the picture. Then, use Command-C to Copy, and press Command-A to select the screen. Next, press Command-V to paste and, after a few seconds, the selection fills the entire screen. If you want a smaller enlargement instead of Command-A, use the marquee to select the size, then press Command-V.

This helps a lot when you want an enlargement, because you can choose the size first instead of slowly enlarging step by step.

STEVEN LEE
BELLEAIR, FL

MACMONEY 3.0

When printing the report "This Month's Activity," you can print only the month currently active (as determined by the Control Panel). To print reports for other months, simply use the Alarm Clock or Control Panel DA to change the date temporarily to the month you want the report for. Remember to change the day to the last day of the month as well, or transactions for that month will be printed only up to the day the System date is set at.

MARK D. KRAUSE
MERRILL, WI

THUNDERSCAN 2.0/4.0



Frustrated that neither version 2.0 nor 4.0 of ThunderScan will operate in the background with MultiFinder? Simply launch version 1.1x of ResEdit, locate your copy of the ThunderScan software that you want to use for a background scan, and double-click on it to open. Locate the SIZE resource, double-click on it, then locate the 0 listing in the SIZE resource. Open this by double-clicking, at which time you should see the words "Can background" with two radio buttons to the side. Click on the 1, and then close the file and save changes. You can now run ThunderScan in the background with MultiFinder.

You can also make most programs MultiFinder

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Education Video Production Animation



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compatible, if they aren't already, by clicking on the "Juggler Aware" button in the SIZE resource just above the "Can Background" radio button. As an example, Picture Base can be adapted to MultiFinder in this way, so long as it is the first application opened under MultiFinder.

RICK LARSEN
POCATELLO, ID

FILEMAKER+

When setting custom paper sizes in the Apple menu, keep in mind that FileMaker+ places the page break at an improper position on the layout.

When the page length is adjusted for labels, the page break shows up on the layout screen at two thirds of the height that you type in the Set Paper Size dialog box. When printed, however, the page break is in the position that you typed.

This bug also causes the layout to extend beyond the page height, causing an alert to appear and disallowing you from using the setting, even though it would print properly.

To assure that you will be allowed to print your whole layout, make certain your paper size is longer than the layout. To bypass the bug, you can set the paper height to twice the necessary height. This will place the page break at one and one third of the layout height on the screen. Although this will cause a blank page to be printed after each good page, at least you'll get the printout lined up with the page breaks on the paper.

If your page height is set to double the label height, the printer will skip every other label. To take advantage of this, print half of your records, place the same pages of labels back into the printer, line up the printhead on the first blank label, and then print the second half of your records. This will *interlace* them, using all of the blank labels.

KEN WHITMORE
HAYWARD, CA

IMAGEWRITER

ImageWriter LQ ribbons are pricey at $19 retail. Notice that only the top edge, approximately ⅜ of an inch, receives the brunt of the printing load. To double the life, simply invert the ribbon in six easy steps:

1. Remove ribbon from printer. Then remove the ribbon clip-in guide (illustration on page 12 of the owner's manual) from the ribbon by gently spreading the guide's frame and releasing the white rollers from the guide. Take slack out of the ribbon with the ribbon knob.

2. Remove the top cover of the ribbon case by releasing the tabs around its perimeter. No more than gentle prying with a fingernail is necessary to accomplish cover removal. You will find "miles" of accordioned ribbon inside.

3. Place the bottom of the case with the ribbon inside on a large flat surface. Release the ribbon at the knob end by pushing the lever near the knob to the side; this pulls apart the knob rollers so the ribbon can be lifted out of the knob mechanism. Release the ribbon at the other end of the case by pushing the flat metal spring to the side. Just "let be" the short length of ribbon.

TIP OF THE MONTH

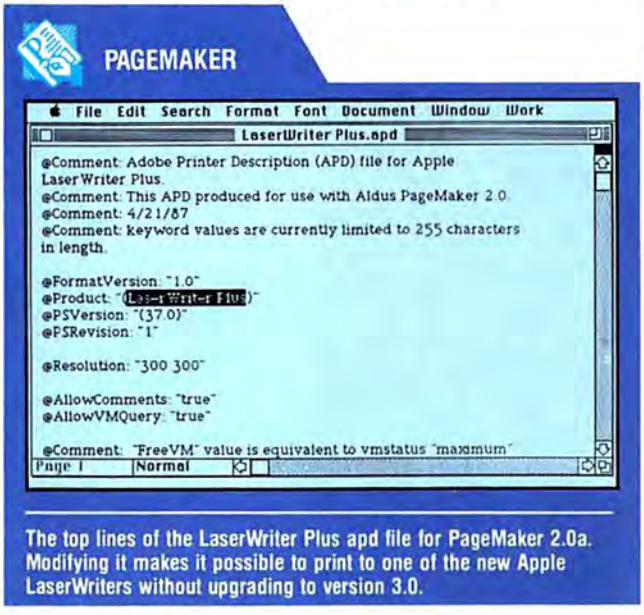
PAGEMAKER

For those who do not have PageMaker 3.0 (or are waiting for their copy), printing with 2.0 to a new generation LaserWriter can be rather trying. Trying to print, for example, to the LaserWriter II/NT results in an alert box informing you to change the printer type. There's a fairly straightforward way around all of this.

Locate the LaserWriter Plus.apd file that came with PageMaker 2.0. This is the file that tells PageMaker what the printer looks like. Open this file as text, using your favorite word processor. You'll see something like the illustrated screen.

Notice the highlighted section. This is the name that you'll have to change. For the LaserWriter II/NT, type in LaserWriter II NT. Make sure that you type the new name exactly as it appears in the PageMaker alert box when the program first balks at printing your file. If your printer has added capabilities (for example, a newer version of PostScript or a higher resolution) make those changes as well. Note that for the LaserWriter II/NT, you can and should also change the PostScript version number in the .apd file from 37.0 to 47.0 to give marked performance increases. Do not forget to use Save As to save your file in *text format* and to use <Printer>.apd as a filename, where <Printer> is the name of the printer. The name you give to this file will show up in the Change dialog box that you get from pressing the Change button in the Print dialog box.

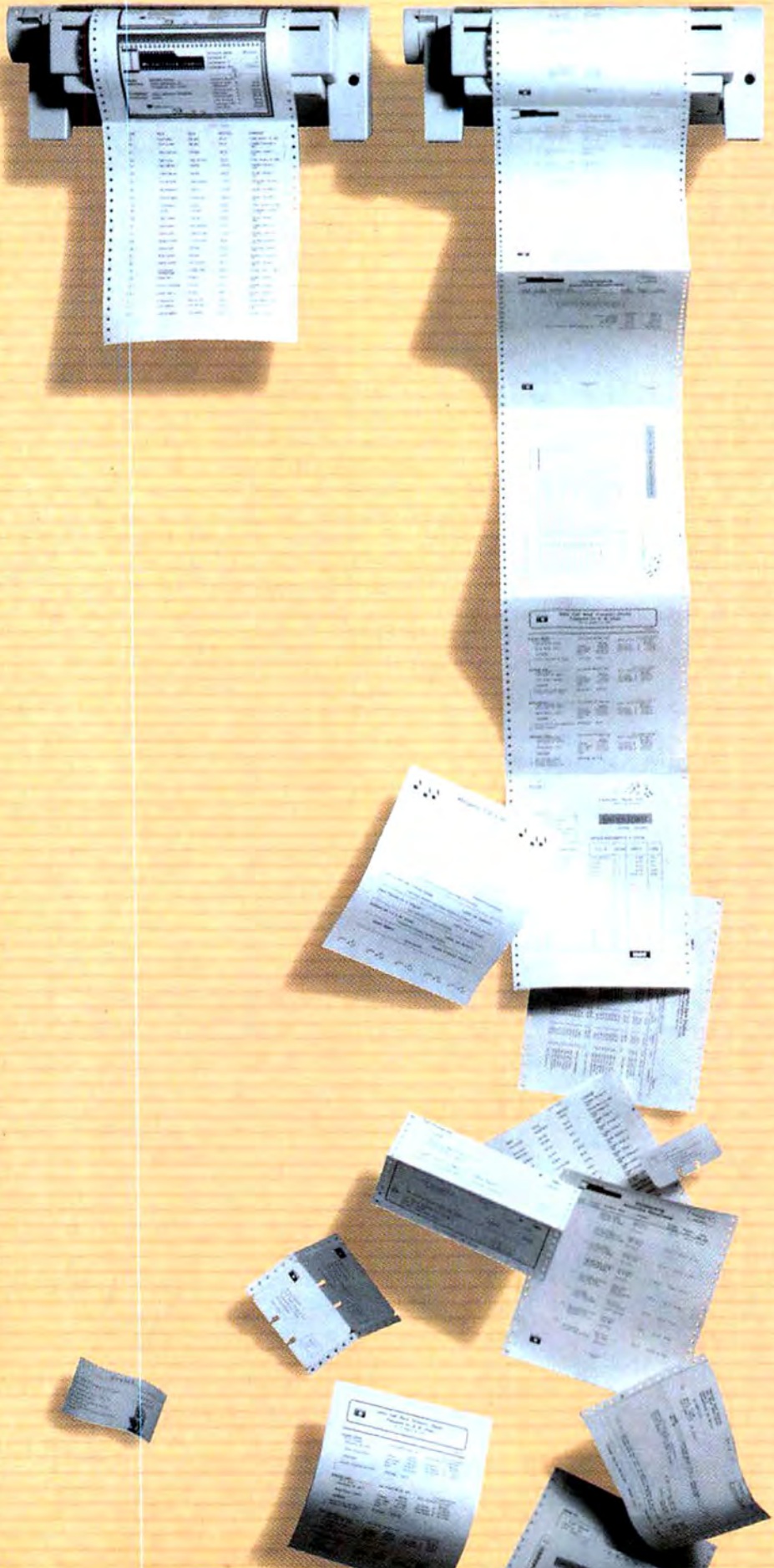
ANTHONY YEN
AUSTIN, TX



The top lines of the LaserWriter Plus apd file for PageMaker 2.0a. Modifying it makes it possible to print to one of the new Apple LaserWriters without upgrading to version 3.0.

HyperCard.™

HyperCard + Reports™...



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Card selection criteria includes <, >, =, ≠, contains, excludes, and more.

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Complete calculation capability.

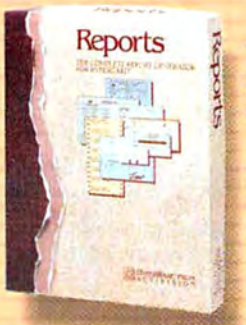
Includes *Preview*™ for viewing formatted reports on screen (a $29.95 value).

If you use HyperCard, you need *Reports.* It will turn your HyperCard data into useful information, any way you look at it.

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Reports™



The Complete Report Generator for HyperCard

HyperWare™ from Activision.

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bon that is outside the case until you have inverted the "accordion" inside the case.

4. Now poke your fingers in the case and compress the ribbon into a size that you can contain with your fingers (use both hands so you can invert the ribbon with wrist action). Lift the ribbon out of the case, invert and put it back in the case without letting go.

5. Rethread the ribbon through the knob roller and spring at the ends of the case. Take up slack with the knob roller and, as you do, the portion of the ribbon that was left dangling outside the case earlier will invert itself. Once the slack has been taken up, continue turning the roller and checking for tangles until the entire length of the ribbon has been cycled through.

6. Reinstall the case cover and the ribbon guide. Pop it back in the LQ.

The whole process takes about 15 minutes.

EDWARD E. SHARP, II
BEDFORD, TX



Like the reader in the June '88 issue, I too have suffered several years with the problem of cut sheet paper slipping and not feeding — a problem that spoiled more sheets of letterhead than I care to mention. The problem can be solved much more easily than by tearing apart the printer by visiting your local stationery supply store and purchasing Bates Platen Clean, made by The Bates Manufacturing Company, Hackettstown, NJ. They supply ten cleaning pads per package for about $15. They're made just for the problem mentioned in the June issue and are easy to use. The pads remove accumulated clay and tars from paper, roller glaze, and correction fluid. After cleaning, the platen has a nice "tack" to it that eliminates paper slippage.

RICHARD E. WIEGAND
PORTLAND, OR

KEYBOARD



Often the most frustrating part of an action game is accidentally hitting the wrong key during the heat of battle. Because all the keys are the same height, it's often difficult to avoid such a slipup. This can be avoided by using a *small* amount of rubber cement to attach a piece of cork to the action keys, raising them above the rest of the keyboard.

MARK MASUELLI
DENVILLE, NJ

[*But be careful when removing the cork and dried cement when play time is over. Otherwise, nubbies of rubber cement might drop into the keyboard!* —*Ed.*]

FINDER



Want to neaten the appearance of the application and document icons inhabiting windows in the Finder?

Open the window you want to tidy up. Go to the View menu and set it so that the window is showing your applications and documents by Name and not Icon or Small Icon.

Use the Select All command under the Edit menu. Drag everything out onto the Desktop and wait a second or two while the Finder catches up with you. Go back to the View menu and reselect By Icon or By Small Icon — whichever you prefer. Then go to the File menu and select Put Away. Your applications and documents will begin quickly arranging themselves in the window in alphabetical order.

BRAD FERGUSON
NEW YORK, NY

QUICKEYS



If you program QuicKeys to scan the menus looking for "Print . . ." and find that it doesn't work in some applications, remember that some applications do the ellipsis after print with three periods and some do it with Option-semicolon. They may appear the same on the screen, but to QuicKeys they're quite different. Here's the solution: Define an application-specific QuicKeys file for each application.

DAVE BURBANK
ITHACA, NY

DESKTOP



The mouse button on the Macintosh is buffered (at least on the Macintosh Plus and SE). So, when I need to open an application directly on one of my hard disks, I just make sure that all the images of the folders and the application's icon are aligned.

Let's say that you have a folder on your desktop called "Word Prgs", inside of which are several folders containing various word processors and associated files (like "Help" and "Dictionary" files). Odds are that there is one application you'll use more than the others, such as Word 3.01, which is in a folder by the same name. Click open the Word Pgms folder, and align the newly opened window so that the Word 3.01 folder is directly over the outline of the Word Pgms folder. (This might take a few tries.)

Once they are aligned, open up the folder called Word 3.01 and align the application Word 3.01 in that window with the previous windows.

Now when you want to open your most used word-processing application, all you have to do is place the arrow cursor in the middle of the Word Pgms folder and click six times to open the two folders and launch the application.

No more moving the mouse around each time a folder window is opened to get the next folder to open. And this trick still allows you to keep a neat desktop with everything in its correct folder.

CRAIG A. PEARCE
BERWYN, IL

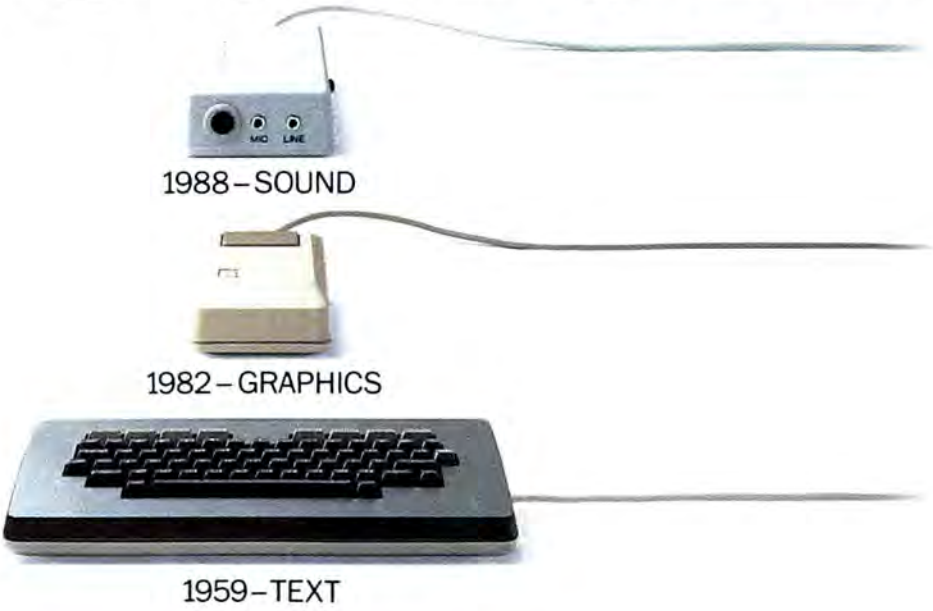
MACWRITE



While using MacWrite's (version 5.0) spelling checker you might come across the following dialog box: "The clipboard is too large to transfer for use by desk accessories or other applications." To be able to use the spelling checker at this point, you must quit MacWrite and then reopen the program or the file you want to check. Those with large amounts of RAM probably won't have this problem.

MIKE TZAVELIS
BROOKLYN, NY

Natural selection.



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Note Cards

HyperCard could become the ultimate musical instrument. Like the song says, "Be it ever so humble, there's no place like Home."

BY KEVIN ELLIOTT

Although the hyper-hoopla has dissipated, HyperCard remains one of the most significant software applications developed for the Macintosh. Its impact is as varied and broad-ranging as Mac users themselves. The diversity of HyperCard's potential is exciting and has made quality editorial coverage a challenge.

MacUser **responded initially with introductory HyperCard features, and next with the monthly section "Flash Cards," to keep track of the most exciting stackware we've seen. We then followed with Michael Swaine's "Card Tricks," a monthly column devoted to HyperTalk techniques.**

This month we introduce a new section specifically for HyperCard. You'll find "Hyperspace" in every issue, with a variety of HyperCard information, including "Card Tricks" and "Flash Cards."

With the release of HyperCard 1.2 (actually, make that 1.2.1., following Apple's latest bug fix), we have an evolving software tool that provides much that was missing from the original version. The most important of these new Apple-supplied features is the ability to handle stacks read from CD-ROM discs. But perhaps even more exciting is the growing library of user-supplied features available for HyperCard, in the form of HyperTalk scripts, XCMDs, and XFCNs. Even the most humble contribution bears witness to a modern phenomenon: a powerful focus of various minds and perspectives, working independently — yet collectively — toward a definition of a shared, visual programming environment.

Whether HyperCard is best described as an information presentation tool, database, programming language, knowledge navigator, custom application builder, revolutionary educational tool, or new art form is something you'll have to decide for yourself. But we'll take the liberty of telling you that outside of any and all of these descriptions, there is something more.

And so welcome to "Hyperspace!"

When HyperCard was first announced, musically inclined Mac users everywhere hummed happily over their synthesizer keyboards and multitrack cassette machines, at the thought of what it might do for them. Musicians were quick to realize that HyperCard's aptitude for sound, graphics, and interactive control would open up new possibilities for them.

No previous programming environment has ever offered such simple and direct access to musical sounds. Write "play harpsichord c3," and out pops a note. Store musical ideas in a free-form, cross-indexed file. Trigger sequences of notes, whole compositions perhaps, with the click of a button. Automate the control of external MIDI instruments. Keep track of recording sessions or performance setups with graphic illustrations. Maybe even learn how to play better!

The potential was there, all right. But as with most HyperCard applications, it has taken time for really useful software to emerge. Only recently have we begun to see polished, bug-free stacks for the music-minded. And it may be a while, yet, before full-blown commercial products emerge with the high gloss of business tools like Focal Point. But right now, you can find a working HyperCard stack to satisfy almost any musical need, at any level of experience — and it'll cost next to nothing, because most of these stacks are free or very inexpensive.

CARD TUNES

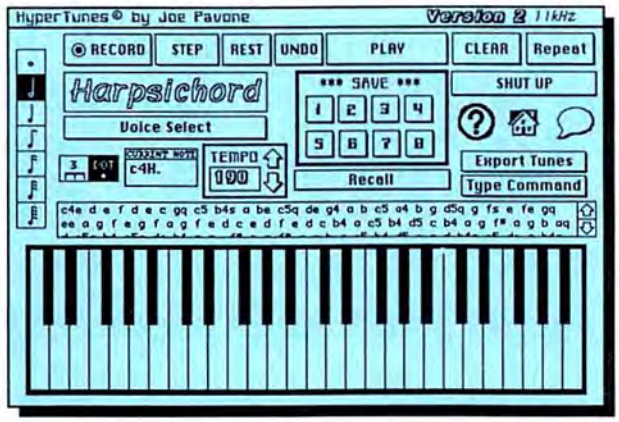
The first music stacks to appear were designed to automate the scripting of HyperTalk music sequences. There are now at least a dozen of them posted on the major networks and bulletin boards. They all provide some way to select combinations of a note's pitch and duration, by clicking on buttons, and a method for storing the selections as a string of notes in a HyperTalk play statement.

The best of these song recorders is HyperTunes (version 2), written by Joe Pavone. It includes just about every imaginable feature for handling HyperTalk sound and play functions with ease. Notes are selected by clicking on a four-octave piano keyboard, with durations chosen from a "palette" that ranges from 64th-note triplets to whole notes. Rests are also available in all durations to create silences and gaps. Entering music in HyperTunes is remarkably quick and easy, especially when compared with some of the clunkier rival stacks. This is a tribute to good card and background design.

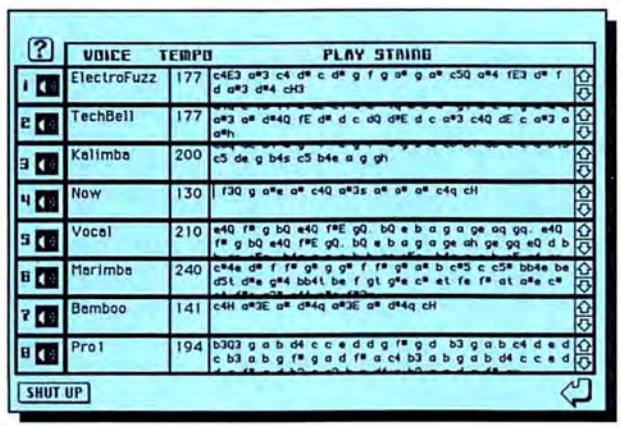
But this stack really stands out from the rest by virtue of its additional features. It comes with 15 built-in sounds, such as Bamboo, Kalimba,

Note Cards

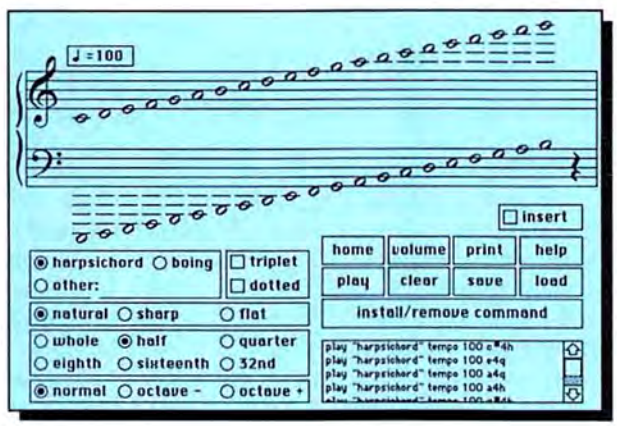
This HyperTunes sequence (in the center of the card) plays a line of a Two-Part Invention by J. S. Bach. Notes are added to the sequence by highlighting a duration at the left, then clicking on the keyboard to select a pitch (or the Rest box to create a silence). The Recall button calls up the Tune Card, which accesses eight stored sequences, and the Voice Select button takes you to a Voice Card where you assign one of 15 built-in sounds.



The HyperTunes Tune Card has eight sequences on call at the click of the numbered buttons to the left. The sequences are of unlimited length and can be edited on this screen with standard text-editing techniques.



Maestro's music scripting/sequencing card has buttons for every note over a six-octave range. Each note selection generates a new HyperTalk play statement in the scrolling script field at lower right.



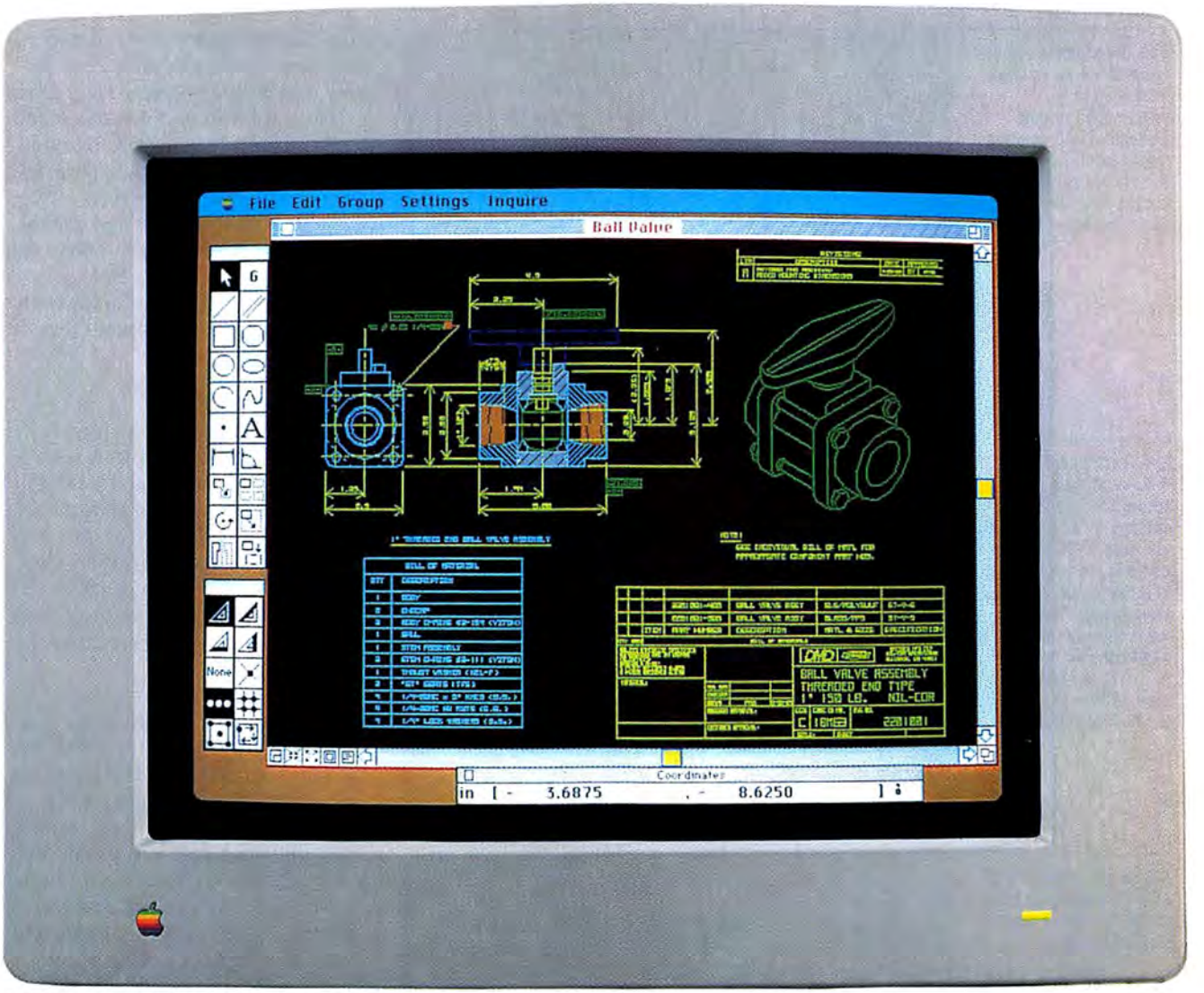
Techbell, and ElectroFuzz. They sound excellent, in spite of the relatively low sampling rate of 11 kilohertz (presumably via Farallon's MacRecorder hardware and HyperSound stack, reviewed in June '88). You can add your own sounds, by making samples and installing them as SND resources. Its export capabilities also make it easy to install a HyperTunes sequence on any button in any other stack. You can save up to eight sequences and recall them quickly from a "tune" card.

HyperTunes never gets in the way of creativity, thanks to thoughtful touches such as a repeat (any number of times) key, and Undo and Shutup buttons. The interface is intuitive, and there is good, succinct help available for each card. The scripting is slick and bug-free. The only complaint I have is that you have to use cut-and-paste operations to recall a stored tune to the active editing buffer; it would be nice if this were handled like everything else in HyperTunes — with a button. I'd also like to see music stack authors translate HyperTalk's arbitrary tempo values into musically sensible metronome equivalents.

But overall, HyperTunes is fun to use, especially for beginning musicians, who will have no trouble creating sequences that sound good. The stack is well worth a $7 shareware fee, which entitles registered users to the enhanced version 2+, with sounds sampled at 22 kilohertz and no limit to the number of sounds and tunes that can be stored.

Two other music script recorders are worth a look, even though they can't keep pace with HyperTunes when it comes to efficient music writing. Maestro and Sound Scripter each work well and incorporate a unique feature or two. Maestro uses notes on a musical staff, instead of a piano keyboard, for input (you still just click on the note you want). It also offers a handy writeMusic command, which imports play scripts into HyperCard from ordinary text files. Sound Scripter uses the standard HyperCard keyboard for input, but it's an exceptional seven octaves long. It

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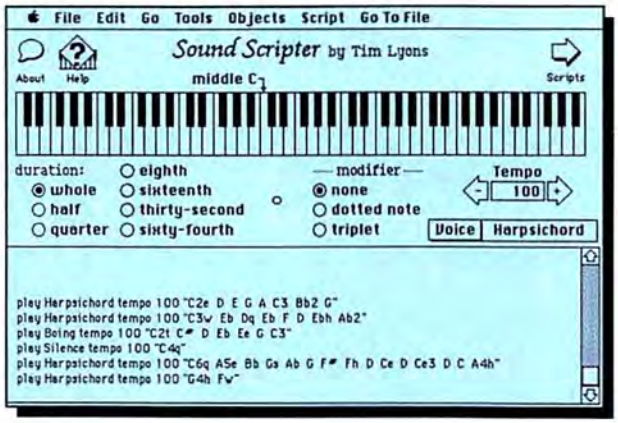
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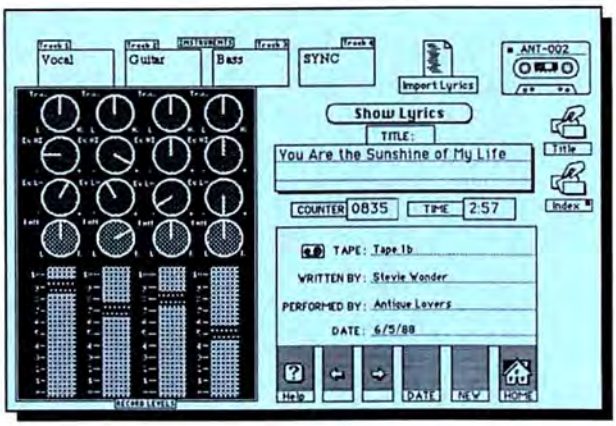
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Note Cards

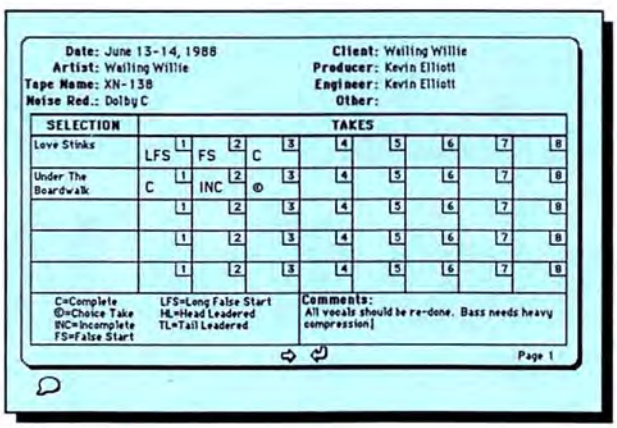
Sound Scripter creates HyperTalk play scripts according to a combination of note (keyboard) and duration (radio button) clicks. Scripts are saved by pulling down the special Script menu.



The Track Sheet card of 4-Track Stack lets you record the approximate settings of volume faders and pan/EQ knobs. The controls are adjusted by clicking on the control, then typing a numeric value representing clock-hand position in a text field. The procedure is slow but lets you print out the control settings.



A Take Sheet card from 4-Track Stack uses letter codes to indicate the status of each take.



also has some sharp spot animation, including a "mini-Pyro" screen display that is seen on every Help card.

If you want to beef up your sound library, take a look at B & B Soundworks' HyperCard Sound Libraries. There are currently two sets — one for musical instruments and one for sound effects. Each has five disks full of sounds and sells for $29.95. A three-disk sampler (combining both instruments and effects) sells for $19.95.

MAKING TRACKS

Another popular application is managing recording projects with HyperCard-generated track sheets. Track sheets are used in recording studios to keep a history of instrument assignments, control settings, and notes for each session and "take." Stacks are available to suit the needs of both amateur and professional recording artists.

Basement studio operators will be interested in 4-Track Stack, by Paul Lemieux, and Home Multitrack Recording Log, by Oscar Hill. Both feature a graphic representation of a tape deck/mixer front panel, where slider and knob positions can be slid and knobbed to reflect the real thing. Text fields are placed for listing instrument assignments, song title and duration, composer and artist, producer and engineer, tape ID, and counter reading.

There are problems with the graphic control panel cards in these stacks. To be useful, the layout of the card should closely match the layout of your own recording equipment. Chances are it won't, since there are so many different machines on the market. And even if your equipment matches, you may find — as I did — that the data-entry systems are too clumsy and slow to make the effort worthwhile. Pencil and paper is probably quicker!

The major difference between the two stacks is the number of tracks accommodated: 4-Track Stack provides for (surprise!) four tracks, while Home Multitrack Recording Log is intended for eight. (An updated version of 4-Track is planned with 6-, 8-,



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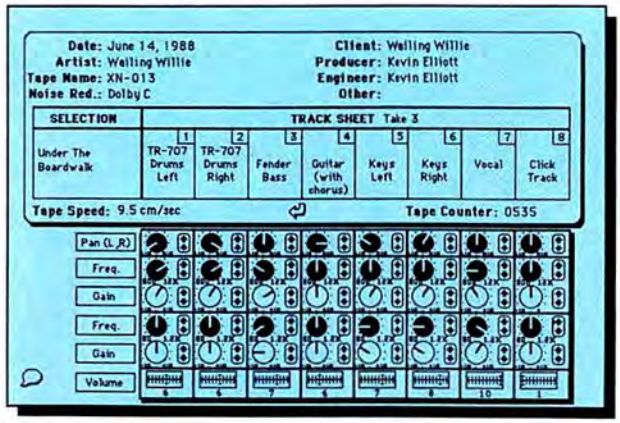
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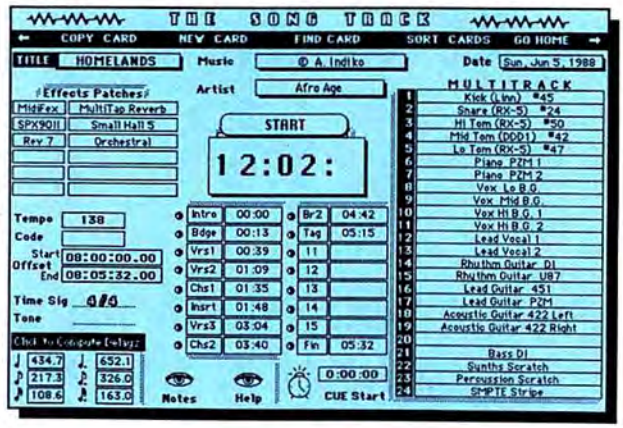
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Note Cards

The Home Multitrack Recording Log main card represents mixer settings for up to eight channels. Knobs are (slowly) adjusted by clicking and holding on the up/down arrows next to each one.



The Song Track card of The Hyper-Song Tracksheet stack shows a great deal of information clearly. The cue points in the center panel are set automatically according to the clock reading when the cue-point button is clicked. The box in the lower-left corner calculates rhythmic delays according to the Tempo setting.



The card layout of HyperTRACKSHEET is clean and simple. Clicking on a track number opens a card of additional information for that track.



and 12-track versions, if there is a demand.) Another difference: 4-Track provides a pop-up scrolling field for filing lyrics, which may be imported from ASCII text files. Home Multitrack has a secondary card, linked to the main card by buttons, for storing information on individual "takes" during a session. Whether either of these stacks will help you depends on your personal preferences and operating methods.

The Cadillac of HyperCard tracksheets is a stack from France (some of the dialog boxes are in French) called Hyper-Song Tracksheet. It's built around a well laid-out card that crams a great deal of information into a small space without sacrificing clarity. It will be most useful to professionals working in a large studio.

Hyper-Song provides a 24-track layout, with ample fields for all the standard information. It goes well beyond the expected, with a number of unique and innovative features like a large digital clock that shows running time, even from across the studio; a tempo field, linked to a box that automatically calculates delay times (in milliseconds) for typical rhythmic echo effects; fields for listing up to six effects devices, and their assigned preset names; 16 cue points (for autolocating the tape on overdubs) that are set by clicking buttons while the tape rolls and the clock runs (the button reads the clock and stores the reading to the cue-point field); and comprehensive card-sorting and searching. Highly recommended.

A simpler 24-track sheet, also intended for pro use, is Jeremy Roberts' HyperTRACKSHEET 0.71. As the revision number suggests, this stack is still under development. The main Card lists the 24 tracks, with a box for a brief description of the track assignment (such as the instrument name). Clicking on any track-number button brings up a scrolling notepad for additional information. The current version has no built-in card-duplication function, which may cause some frustration. And those who don't use time-code synchronization may be annoyed to find that one track must be dedicated to time code. It's a



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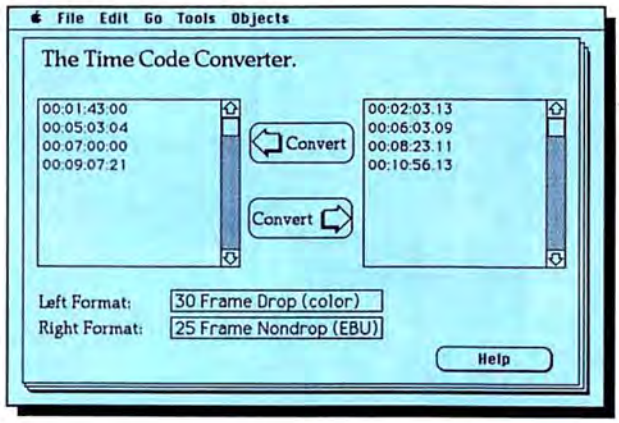
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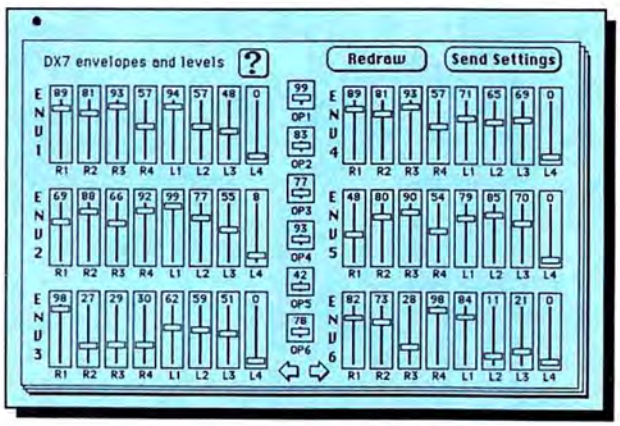
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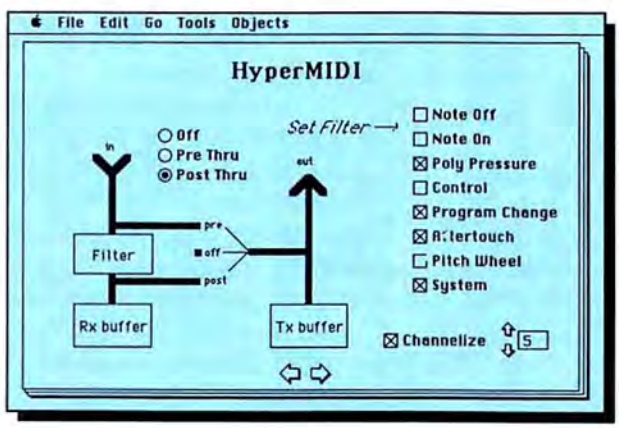
The Time Code Converter stack is simplicity itself. Select a time-code format for each window, enter the known frame value on the appropriate side, click on the convert button, and in five seconds you have the converted frame number in the other window.



This sample HyperMIDI application sets envelope rates and levels on a Yamaha DX7 or similar synthesizer. The sliders move smoothly in the direction of the mouse as you click and drag. Send data to the synthesizer by clicking on the Send Settings button.



This HyperMIDI application uses MIDI toolbox filter commands to remove dense and unnecessary controller data from the MIDI stream.



useful feature if you do use sync, though.

Either of these 24-track sheets can be used for smaller studio configurations as well. Don't be put off by the lack of a graphic panel representation — you'd probably find such displays to be of limited use in practice.

Another useful pro tool is John Worthington's Time Code Converter. It's a simple stack but very practical for musicians working with video and film.

It converts time codes among any combination of the four standard protocols of SMPTE time code (30-frame drop and non-drop, 25-frame non-drop, and 24-frame non-drop), and raw frames. It works reliably, quickly, and easily. (If you aren't sure what this terminology means, see "SMPTE-MIDI Journey" in this issue.)

'S WONDERFUL, 'S MARVELOUS

The full power of HyperCard in musical applications can be unleashed only through external command sets that link it, via MIDI, to record and control synthesizers, samplers, drum machines, mixers, lighting controllers, and other devices. Potential applications range from simple sound librarians for synthesizers to tasks such as algorithmic composition, sequencing, mixdown automation, and scripted control of complex multimedia performances.

The most complete MIDI programming toolkit currently available for HyperCard is HyperMIDI 1.1. The stack is built around a set of external functions and commands (XFCNs and XCMDs) that allow for active control of MIDI devices, and transmission and reception of MIDI data. These are high-powered, speedy routines, written in assembly language, accompanied by 14 pages of excellent documentation on disk.

You can't take full advantage of HyperMIDI's routines unless you are willing to get involved in the nitty-gritty of HyperCard scripting. However, the whole point of the stack is to make MIDI programming as accessible to novice programmers as HyperTalk scripting. To help beginners get

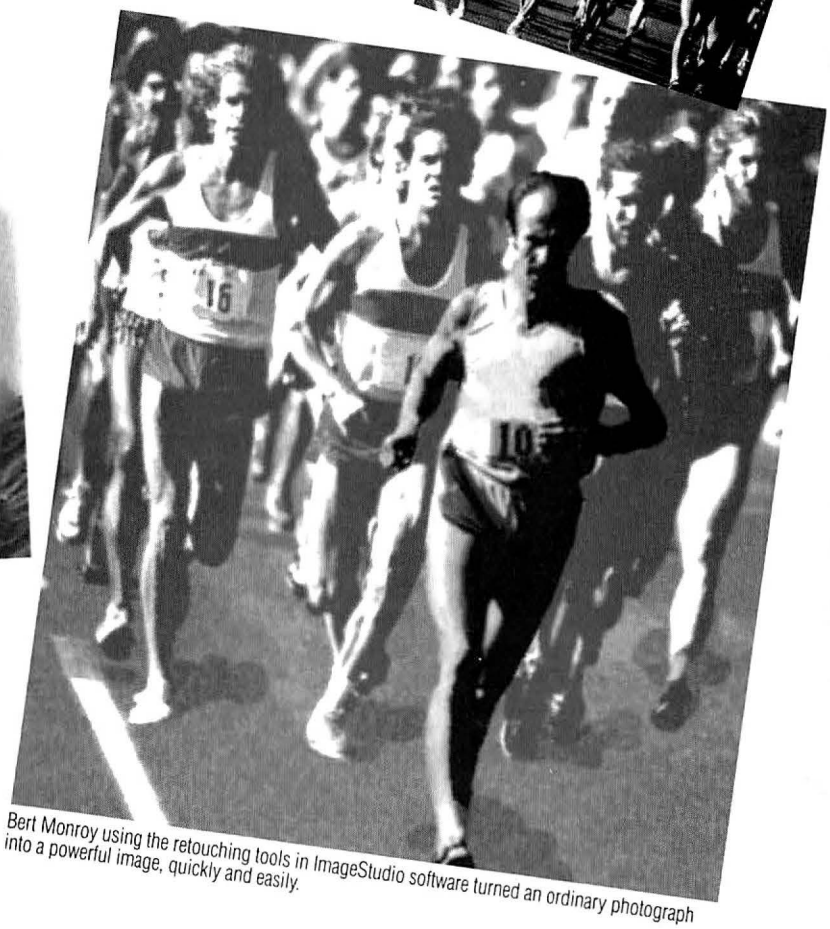
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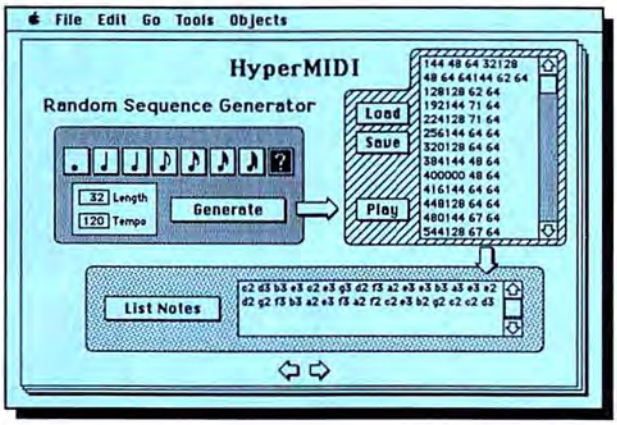
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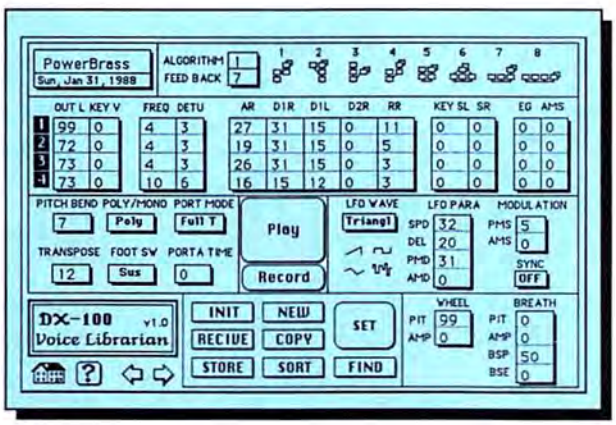
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Note Cards



A simple random-sequence generator constructed with HyperMIDI XCMDs and standard HyperCard buttons and graphics.



A full-screen editor for Yamaha four-operator synthesizers such as the DX100. It is scripted in HyperCard using the MIDI XCMD external command toolbox from Japan. Not quite as smooth as the functions in HyperMIDI, but still very capable.

started, HyperMIDI comes with half a dozen demo cards and scripts, including a data analyzer, a patch changer, a random-sequence generator, a Roland D-50 synth patch librarian, and a card to scale envelopes for the Yamaha DX-7 synthesizer's notoriously difficult envelopes graphically.

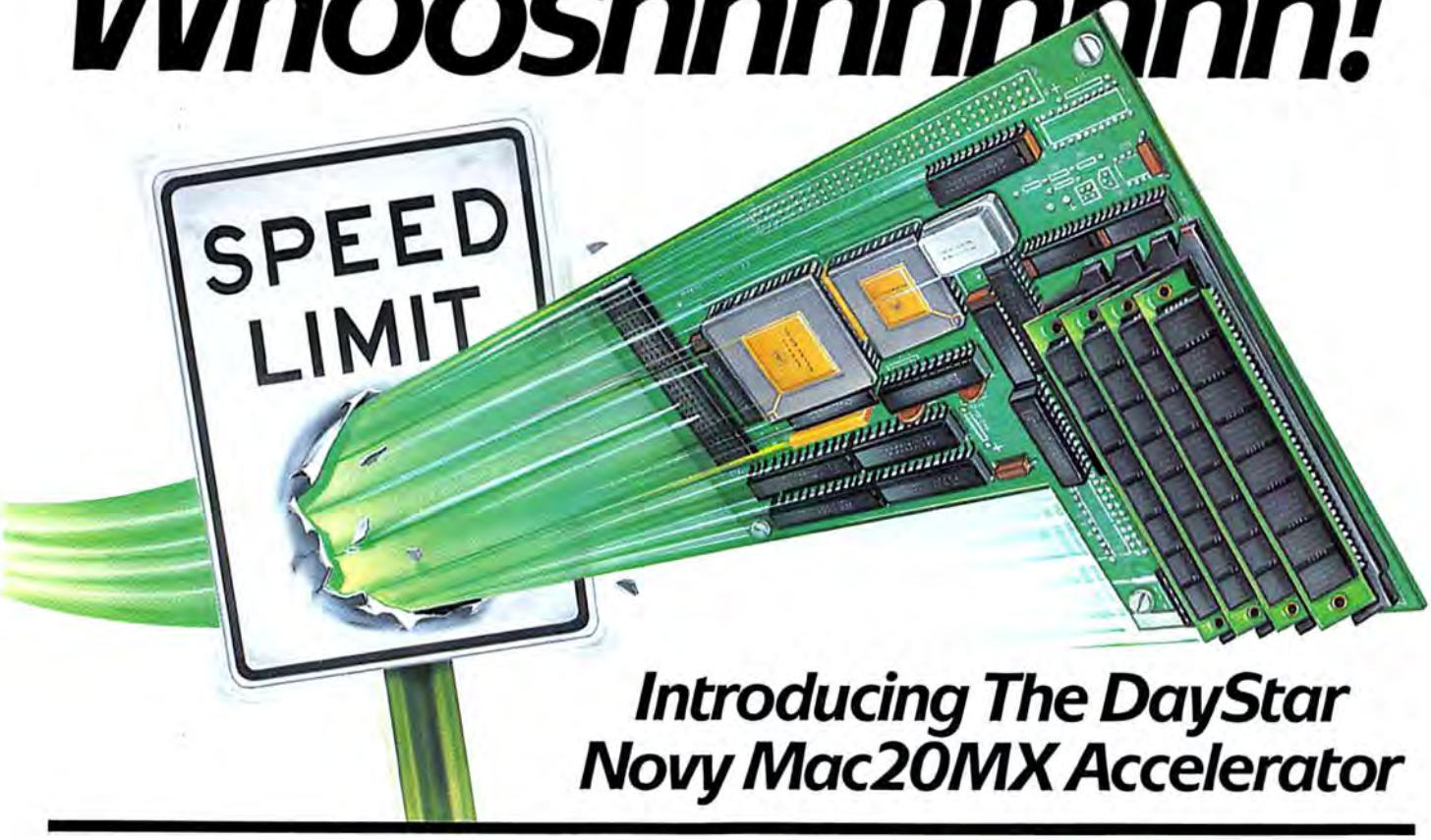
The HyperMIDI toolbox provides HyperTalk commands to set MIDI transmit and receive buffers, to send and receive MIDI data strings, and to process MIDI data in various ways (filtering, time-stamping, conversion to symbolic notation, and so on). It also includes a set of commands for designing sliders to generate almost any imaginable MIDI data from a HyperCard. Think of it as a MIDI construction set. Combined with the simplicity of HyperTalk, it provides the quickest possible pathway to real MIDI programming.

In the current revision, the demo applications are extremely impressive. The sliders are smooth and a joy to operate, equaling the best interfacing to be found in today's commercial MIDI software. Author Nigel Redmon continues to develop the toolbox. Plans for coming releases include more extensive utilities for a number of popular synthesizers and MIDI effects units, fuller documentation, and a thorough tutorial. Additional control types will be added to the slider-handling commands, and more task-specific XCMDs will be added as plug-in modules that will require little or no programming.

Another set of external MIDI commands has been developed in Japan by Kunihito Koike. His MIDI XCMD 1.1 is less complete than HyperMIDI but is also very promising and functional. It comes with a rudimentary MIDI sequencer and an impressive full-screen patch editor for Yamaha DX-100 synthesizers, as demos. But as the brief documentation points out, "Good luck! . . . this is MIDI adventure stackware," so it doesn't have a manual. You need a fair understanding of MIDI programming to make any headway. Definitely not for beginners.

A final MIDI control application

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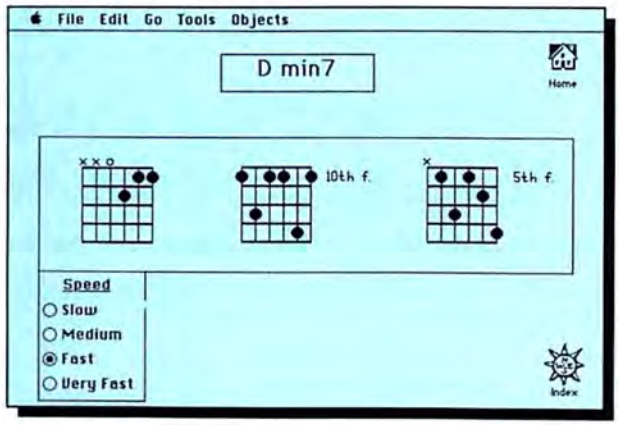
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Note Cards

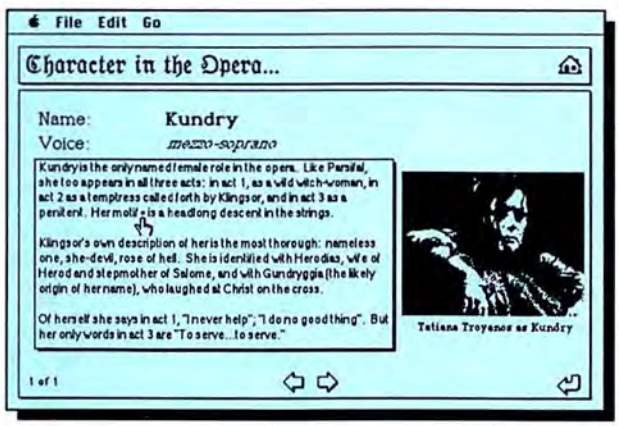
The large button fields in the Xylophone Composer stack for preschoolers make it easy for toddlers to manage the Macintosh mouse. A child's clicks are stored as a sequence of play commands and can be replayed using HyperCard's built-in musical sounds.



The chord diagrams in the Guitar Chording stack use a specially-designed font called Guitar 24. The diagrams show where to place fingers on the fretboard to form the selected chord. Clicking on the diagram plays the chord in broken form.



They may never replace baseball cards, but the character cards in J. M. Anderson's Parsifal stack are becoming collector's items among opera buffs. The small black square indicated by the pointer is a button that plays Kundry's musical theme or leitmotif.



for HyperCard comes from Southworth Music Systems, and it is limited to use with Southworth's MidiPaint. MidiPaint is a powerful sequencer used widely by professional musicians. The MidiPaint Stack allows MidiPaint sequences to be played in the background, by external MIDI instruments, from any stack. Up to thirty separate sequences can play at once (!), and you can get on with other HyperCard activity while they play. Combined with Southworth's forthcoming MaxAudio sound-processing card, the MidiPaint Stack makes direct recording into MidiPaint files via HyperCard possible. This points the way to the possibility of a full-featured MIDI sequencer in HyperCard.

Note that a MIDI interface, and at least one MIDI musical instrument are required to use these MIDI-oriented stacks. In addition, the Southworth MidiPaint Stack requires MidiPaint and a JamBox MIDI interface.

LEARN, BABY, LEARN

HyperCard's built-in music functions and interactive design make it a natural for music education. Surprisingly, educational stacks have been slow to develop. But there are a few good ones to be found if you dig around.

Xylophone Composer is a good, simple player/recorder for preschool kids. It's fun and should be effective in teaching the names of musical notes and for developing a sense of pitch. The "Boing It!" button is a nice touch.

For more mature learners, Paul Lemieux (of 4-Track Stack) has created a guitar-chord tutor stack called Guitar Chording. This is a simple but effective educational tool for those learning to play guitar. It gives a fretboard representation of standard playing positions for ten chord types (such as minor, major, diminished, and major 7th) in all 12 keys. Clicking on any fret chart plays the chord, arpeggiated at adjustable speeds. Thus, the stack teaches how to play the chords as well as what the various positions sound like. The stack in-

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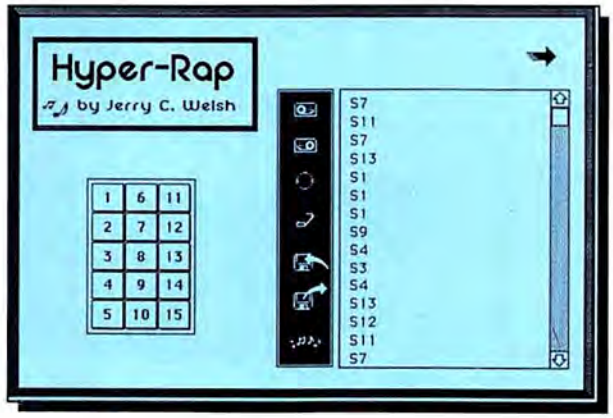
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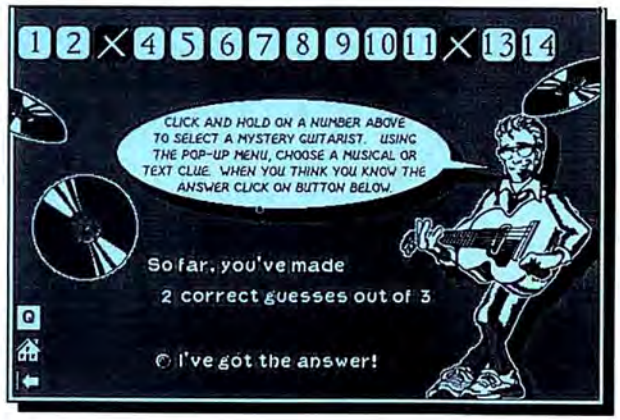
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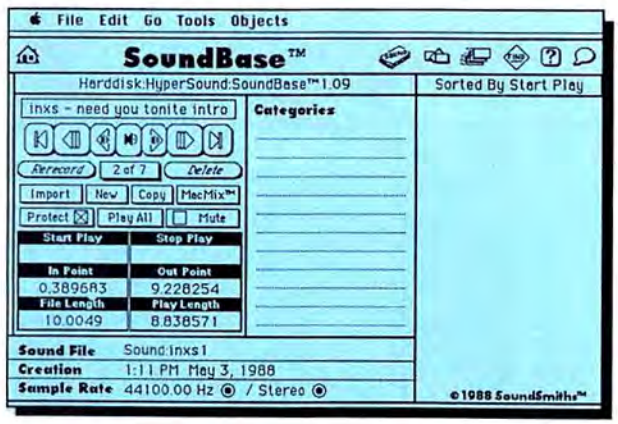
In the main card of Hyper-Rap, the notation in the scrolling field represents a sequence of mouse clicks on the numbered buttons to the left. Each button produces a different percussive break sound. Icons in the center panel control a variety of playback modes. (It sounds better than it looks!)



An entertaining idea, combined with good graphics, animation, and clues sampled from compact discs makes for a fun quiz in Name That Guitarist.



SoundBase helps organize music recorded using the Dyaxis hard disk recording system with MacMix software. Using this stack as a front end, you can associate your own keywords or indexing information to different tracks.



cludes a guitar chord font that can be extracted using the Font/DA Mover.

Parsifal has attracted a lot of attention, thanks to its effective use of the hypertext concept. This three-stack set is a database of information about Wagner's opera. Links between the stacks interrelate details of the story, interpretations and criticisms, characters, musical themes, recordings, and bibliography. Buttons within text fields trigger relevant sounds and graphics — musical themes and drawings of characters and objects.

The stack is far from finished — it's a dangling Parsifal — and many characters and themes are not yet included. But Parsifal offers some inspiring clues to intelligent use of HyperCard for communication. And even in its current unfinished state, the stack is certainly worth a browse. Author J. M. Anderson continues to develop and improve it, so keep an eye out for the latest version.

TAKE FIVE

Finally, have a look at a couple of the best music-oriented stacks intended primarily for entertainment.

Hyper-Rap is a novel sequencer that comes with 14 "rap"-style sound effects (scratches, claps, bangs, and the like) that you assemble into authentic-sounding "break" loops by clicking on buttons. The results can be surprisingly good: Raps from this stack are already appearing in other stacks making the rounds. But it isn't easy to get the effect you want, because the sounds all have different durations, and it's tricky to calculate the rhythm. If you get rapper's block, there's a random-sequence generator built in. Raps can be played in three modes: forward, backward, and looping. The stack is buggy: It doesn't save without debugging, and there's no "Go Home" button, or "Help" button (although help is available).

Name That Guitarist is a tongue-in-cheek quiz game that has you trying to guess the identity of 14 prominent rock guitarists from digitized snippets of their records. The graphics are slick, with several effective spot animations. Recommended for a few minutes of light diversion.

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Directory

Most of these stacks can be obtained from CompuServe, PAN, user groups, or public-domain software catalogs. If you find the stack useful, remember to send in your shareware fees.

Paul Lemieux
904 Jason Court
Cary, NC 27511
4-Track Stack 1.01
Shareware: $2
Guitar Chording
Shareware: $5

Home Multitrack Recording Log 1.9
Available on CompuServe and other networks, as "Multitrack"
Free

HyperCard Sound Libraries
B & B Soundworks
P.O. Box 7828
San Jose, CA 95150
$29.95 per library; sampler: $19.95

HyperMIDI 1.1
EarLevel Engineering
21810 Barbara Street
Torrance, CA 90503. Shareware: $5 for disk, $30 for registration

Hyper-Rap
Available on CompuServe
Free

Hyper-Song Tracksheet
Available on the PAN network;
Author unidentified

HyperSong
Dalcon Desktop Systems
1222 16th Avenue South
Nashville, TN 37212
$99

HyperStudio
Smoketree Productions
9752 Baden Avenue
Chatsworth, CA 91311
(818) 980-2211
$133.95

HyperTRACKSHEET 0.71
Available on the PAN network;
Author: Jeremy Roberts

HyperTunes version 2
Joe Pavone
204 Purchase Street, Room #3
Rye, NY 10580
Shareware: $7

Maestro
Steve Merel
400 Ardmore Avenue
Manhattan Beach, CA 90266
Shareware: $5

MidiPaint Stack
Southworth Music Systems
91 Ann Lee Road
Harvard, MA 01451
(617) 772-9471
Shareware: Request contributions of Christmas song sequences and visuals

MIDI XCMD version 1.1
Kunihito Koike
2-20-41 Hiyosi, Kouho-ku Yokohama, Japan 223
Free

Name That Guitarist
Greg Neutra
c/o Playings Hard To Get
Box 194
Cerrillos, NM 87010
Shareware: $5

Parsifal
Available on CompuServe
Free

Sound Scripter
Tim Lyons
9211 Palmer Road
North East, PA 16428
Free

SoundBase
SoundSmiths
500 East 63rd Street
Suite 25A
New York, NY 10021
(212) 751-7723

Time Code Converter
Available on the PAN network
Free

Universe of Sounds
Optical Media International
485 Alberto Way
Los Gatos, CA 95032
(408) 395-4332

Xylophone Composer
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Free

NEW WAVE

Where does music stackware go from here? We can expect speedy development of the MIDI connection: Look for full-featured standard MIDI applications (sequencers and editor/librarians) with HyperCard front ends.

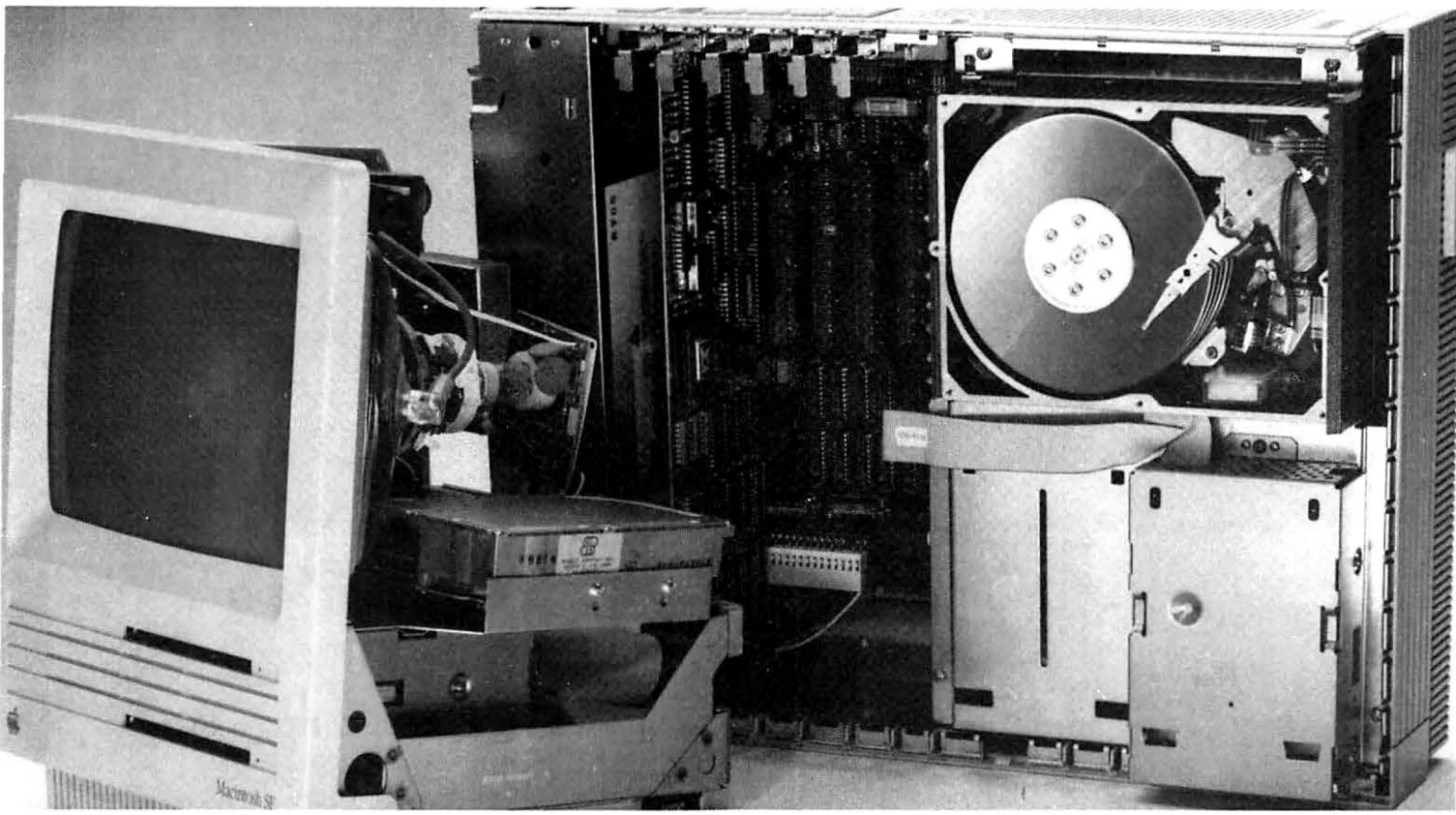
A couple of high-end stacks designed for pro studios may be available by the time you read this. HyperStudio is a massive stack designed to handle the business aspects of a recording studio. It was developed by Doug Parry of Smoketree Productions. HyperSong from Dalcon Desktop Systems is a database for song lyrics and lead sheets stored in word-processor or music-notation files. An off-the-shelf version of HyperSong is available for $99, although Dalcon prefers to include the stack as an option in customized turnkey systems. The full version can include options that, for example, track what key you perform each song in, log copyright and licensing data, and even generate contracts.

HyperCard is also being used as a front end for hardware and compiled applications. Soundsmith's SoundBase is a HyperCard front end for MacMix, the software used with the Dyaxis disk-based recording system from IMS. And Optical Media International has developed a HyperCard front end for its Universe of Sounds compact disc library of sampled instruments and effects.

I expect to see (hear?) a boom in educational music stacks. Computers have a proven record in the coaching of music skills, and HyperCard — with or without MIDI — makes a simple job of designing interactive tools for ear training, score reading, and music theory. As HyperCard becomes a permanent fixture among the next generation of musicians, Simon and Garfunkel won't be the only ones who are Home-ward bound.

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by Michael Swaine

Programmer's Pegboard

This month's column presents a solution. I've heard that the presentation of a solution should begin with a statement of the problem that it solves, and the problem, I'm sorry to say, is all too apparent to me as I sit here this morning before my Integrated WorkSurface.

I've never felt myself a part of the various DTx movements such as Desktop Publishing, Desktop Engineering, and Desktop Communications. I can't help but think that it's because I don't have a desktop. I can't work comfortably at a desk; I find it too constraining. But that's not The Problem.

After all, I have my Integrated WorkSurface. My IWS consists of two tables (one of which looks like something upon which I cut up frogs in high school) butted against one another in an L shape plus a two-drawer file cabinet of the same height, for a little extra surface. Arrayed across my IWS as I survey it this morning are the Mac II, an AT clone, two monitors, the trusty old ImageWriter, a modem, 12 books on HyperCard, an empty beer bottle, various other books and magazines, the week's mail, my keys, the telephone, a harmonica, pencils, a tape dispenser, a stapler, a television set (for the "I Spy" reruns), disks, two coffee cups, a rock from the garden, a salt shaker, uncountable Little Yellow Sticky Notes, and a half-eaten ear of corn. These confessional details may point out several problems with my work habits, perhaps even some deep-seated psychological problems. But they still do not represent The Problem. Not quite.

The Problem is that the desktop metaphor that is the heart and soul of the Macintosh user interface is too good. One's electronic desktop comes in time to resemble one's actual desktop (or in my case Integrated WorkSurface). The heart and soul of my



user interface is a heart of darkness and a lost soul. My electronic IWS is a voracious electronic mouth that swallows information, and I guess you can see what unpleasant images for information retrieval that last metaphor produces.

I lose things. That's my problem. I suspect I'm not alone in this. And HyperCard makes the problem worse, not better.

Consider the new things you have to keep track of if you have begun to create stacks. A simple stack can easily have a dozen scripts, all hidden. Many of these scripts will be usable directly or with slight modification in other stacks, but if you have a couple of dozen stacks with a mere dozen scripts in each, you have hundreds of these programming tools to keep track of.

Maybe you already had problems keeping track of resources. Is that font in the application or in the System? But unless you have programmed before, you probably have not had to keep track of which icons, sound resources, external commands, and external functions were in which files. Now you do. HyperCard stack development presents you with a real information-management challenge. If you enlisted in HyperTalk programming because the recruitment poster made it look like fun, you may be dismayed to find that it's not just an adventure, it's a job.

This aspect of The Problem is related to a second aspect. If the devil in the first aspect is chaos, the devil in the second is corruption. Just last night I downloaded an on-line debate on the issue of commercial stackware products' modifying the user's Home stack. The authors of such programs feel they have to install resources and scripts and buttons in the user's Home stack in order to provide global capabilities, and they may be right.

But how do you know that these modifications are benign? Maybe the author of MediaGenics' Reports knows what he's doing, but can you trust a public-domain utility stack that installs resources in your Home stack? When your System crashes while you are running HyperCard, how do you trace the culprit in what has become a multisource software product?

The solution to that one may be to go back to the unmodified Home stack that you have locked up in that drawer for emergencies. That's related to a good technique for stackware developers who are creating stacks for broad distribution: Do all your development in your modified, souped-up HyperCard environment and then test the finished product with an unmodified release version of HyperCard and the Home stack to ensure that you haven't used anything your users don't have. But abandoning your Home stack because you suspect that one of the pro-

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CARD TRICKS



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gramming tools installed in it is causing you problems is an extreme measure. Ideally, you should be able to remove such tools selectively, and if it were easy to tell which scripts, buttons, and resources were part of HyperCard and which you had added at some time, it would be easy to do just that. But it isn't. That's an aspect of The Problem.

I ran into another aspect of The Problem when I was putting together a set of tools to include in my HyperTalk programming book. Readers of the book would be new to HyperTalk, and I didn't want to confuse them about which capabilities were inherent in the language and which were add-ons. Apple has already muddled people's perception of the product slightly by including without explanation the external command Flash, which most people now think is a HyperCard command. I didn't want to make that mistake. I needed a way to make various programming tools (scripts, buttons, external commands, and functions) readily accessible for use in stacks that my readers would create without fundamentally changing the way in which HyperCard works and without messing with their Home stack any more than I had to. I found one clue in Stan Krute's "To the Macs" column in the April '88 issue of *Dr. Dobb's Journal.* In HyperTalk programming, learning from others' work is good, and acknowledging those others is important. Stan dealt with buttons in clusters and provided ways to add or remove them efficiently. An idea was taking shape.

When it finally solidified, the idea was pretty obvious. If you've got a lot of things to keep track of, you build a database. HyperCard has some abilities along those lines, so you create a stack. I did that; the stack I created keeps track of what programming tools (resources, scripts, and buttons) I have installed in every stack. This Programmer's Pegboard database stack also contains handlers to add or remove those resources, scripts, and buttons. I can't print the entire stack here, but I can give you the database engine, the specs for the database fields, and the short Home stack script that will make it accessible from anywhere in your personal HyperSpace.

What's chiefly lacking are the routines to do the actual moving of resources, handlers, and buttons. Without them, this is just a database for keeping track of where you've installed tools, and that's useful, I think. But it has the drawback that any database has: You gotta put the info in or it ain't any good. With the installation and deletion routines, the Programmer's Pegboard becomes more useful because the act of installing or removing these tools automatically triggers the recording of the act. I'll give you those routines next month.

```
-- Programmer's Pegboard Version 1.0, July, 1988
-- Written by Michael Swaine
-- Designed for tutorial purposes and released to the
-- public domain. May be used freely.

-- This script maintains a library of reusable
-- software components, installing them in scripts,
-- removing them, and keeping track of where they
-- are installed. The components can be resources,
-- scripts, or buttons.
-- To keep track of the components, this script
-- requires that the stack in which it is installed
-- contain four scrolling card fields named Stacks,
-- Resources, Scripts, and Buttons. These hold the
-- names of stacks in which you install the components
-- and the names of the resources, scripts, and
-- buttons that you've chosen to treat as reusable
-- software components.

On openStack
   -- This handler is invoked when stack is opened.
   -- It directly maintains the field of stack names.
   -- The name stored is the full path name of  stack.
```

```
-- It messages two other handlers to maintain the
-- fields of resource, script, and button names
-- and to perform the installation and removal
-- of components.
Hide message box
 Global pbTargetStack, pbFieldNames, userLevel
-- Debugging:
Put empty into bkgnd field debug
If pbTargetStack is empty then exit to HyperCard
Put the userLevel into oldUserLevel
Set the userLevel to 5
 Put "Stacks,Resources,Scripts,Buttons" ¬
into pbFieldNames
Put item 1 of pbFieldNames into pbFld
-- If current stack is not in the database, add it.
If pbTargetStack is not in card field pbFld
Then
   Put 1 + the number of lines of card field pbFld¬
   into pbLine
   Put pbTargetStack into line pbLine of card ¬
   field pbFld
   Repeat with i=1 to 3
      Put item i+1 of pbFieldNames into line ¬
      pbLine+i of card field pbFld
   End repeat
End if
-- Find the entry in the database
-- for the current stack.
Repeat with i=1 to ¬
   (the number of lines of card field pbFld)
   If pbTargetStack is in line i ¬
   of card field pbFld
  Then
     Put i into pbLine
     Repeat with j=1 to 3
          Put line pbLine + j of card field ¬
          (item 1 of pbFieldNames) ¬
          into line j of prevList
       End repeat
       Exit repeat
    End if
  End repeat
  -- For each type of reusable component,
  -- offer to insert/remove items in database.
  Repeat with i=1 to 3
     DbUpdate i,pbLine
  End repeat
   StackUpdate pbLine,prevList
   Set the userLevel to oldUserLevel
   Put empty into pbTargetStack
End openStack

On dbUpdate n,pbStack
   -- This handler conducts a dialog with the user,
   -- offering to add items to or remove items from
   -- the stack specified by parameter pbStack.
   -- The items are components read off from
   -- one of the files containing the names of the
   -- reusable components.
   -- The parameter n indicates which of the files.
   Global pbFieldNames
   Put empty into pbList
   Put item n+1 of pbFieldNames into pbTool
   -- Allow user to skip viewing any type of component.
   Answer "Do you want to see" && pbTool & "?" ¬
   with "Yes" or "No"
```


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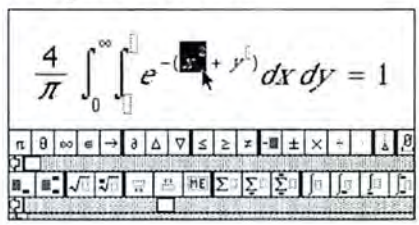


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CARD TRICKS

```
If it is "Yes"
Then
   -- The interaction with the user is not
   -- sophisticated. Each item from the field
   -- (each resource, script, or button) is
   -- presented; if it's already installed in the
   -- stack, the user is asked if it should be
   -- removed; otherwise, the user is asked if it
   -- should be installed.
   Repeat with i=1 to the number of lines ¬
      of card field pbTool
      Put 0 into pbFound
      Repeat with j=2 to the number of items of ¬
         line pbStack+n of card field ¬
         (item 1 of pbFieldNames)
         If item 1 of line i of card field pbTool ¬
         = item j of line pbStack+n of card field ¬
         (item 1 of pbFieldNames)
         Then put j into pbFound
      End repeat
      If pbFound=0 then put "Add" into action
      else put "Remove" into action
      Answer item 2 of line i of card field ¬
      pbTool with action or "Skip"
      -- If the user requests an installation or
      -- removal, add the item to a list.
      If it is not "Skip"
        Then
           If pbList is empty
           Then
              Put item 1 of line i of card field ¬
              pbTool into pbList
           Else
              Put "," & item 1 of line i of ¬
               card field pbTool after pbList
           End if
        End if
      End repeat
      -- Handle all the items in the list.
      Repeat with i=1 to the number of items ¬
        of pbList
        Put 0 into pbFound
        Repeat with j=2 to the number of items of ¬
           line pbStack+n of card field ¬
           (item 1 of pbFieldNames)
           If item j of line pbStack+n of card field ¬
           (item 1 of pbFieldNames) = item i of pbList
           Then put j into pbFound
        End repeat
        If pbFound>0
        Then
           Delete item pbFound of line pbStack+n of ¬
           card field (item 1 of pbFieldNames)
        Else
           Put "," & item i of pbList after line ¬
           pbStack+n of card field ¬
           (item 1 of pbFieldNames)
        End if
      End repeat
   End if
End dbUpdate

On stackUpdate pointer, oldList
   -- Here's where you'd do the actual installing
   -- and removing of components.
End stackUpdate
```


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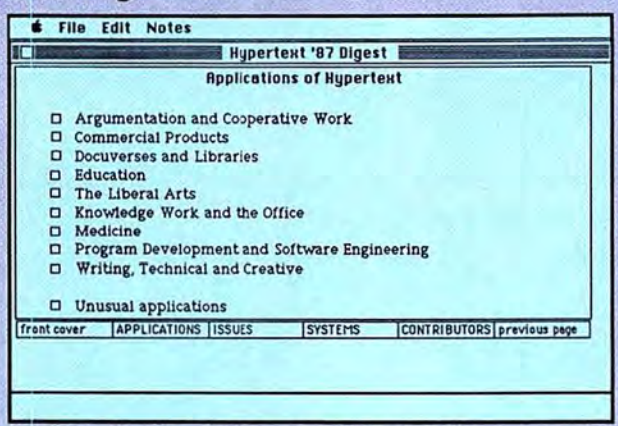
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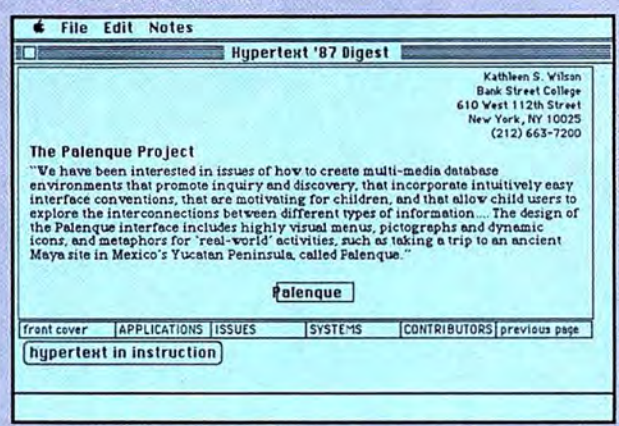
Since "Flash Cards" premiered in our December '87 issue, we have been showing you the good, the bad, and the ugly. Stacks in general are getting more sophisticated, yet we still receive many attempts from first-time HyperCard users. We've introduced you to a variety of applications — from a goldfish bowl and an infinite number of Rolodex variations to a tour of the brain and a video-applications interface. Some of our Flash Cards' listings have graduated to Quick Clicks and full-feature articles.

You can find the shareware and freeware stacks on bulletin boards and the commercial stacks at your local software emporium. For freeware, please send a blank disk and a SASE. If you create a stack that you think others will be interested in, send it to Flash Cards, c/o MacUser, 950 Tower Lane, 18th floor, Foster City, CA 94404. We can't promise to show your stack, and we can't return your disk.

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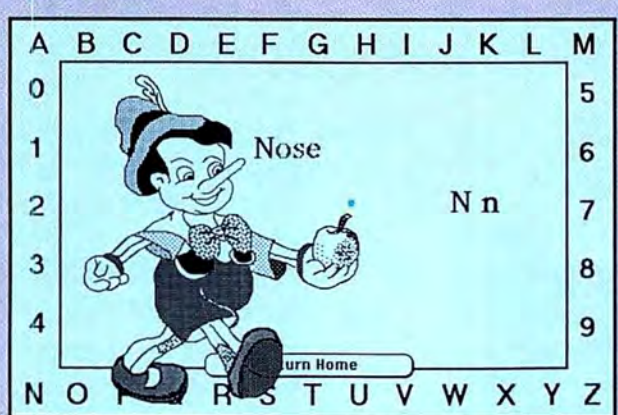


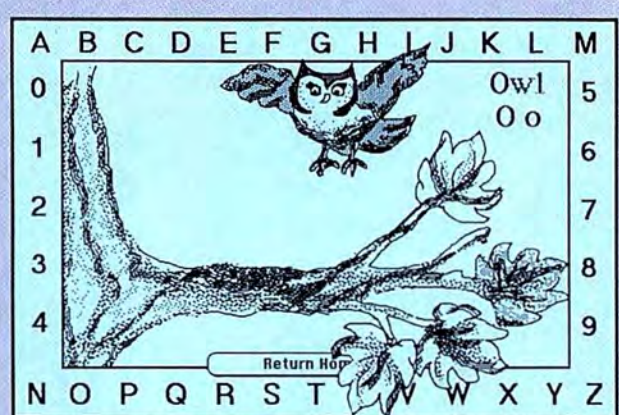
This stack reviews more than 100 position papers presented at the first international Hypertext Workshop. It's an informative source of uses of hypertext and its applications.



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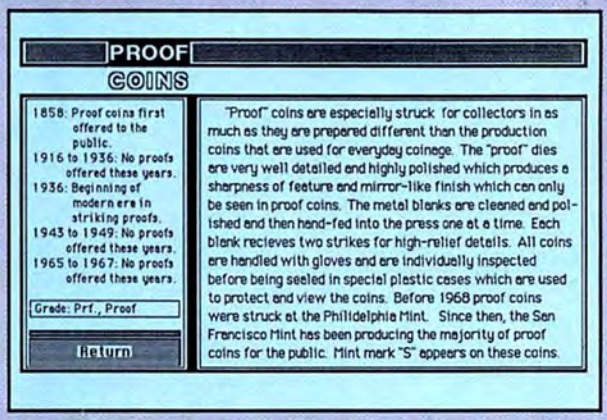
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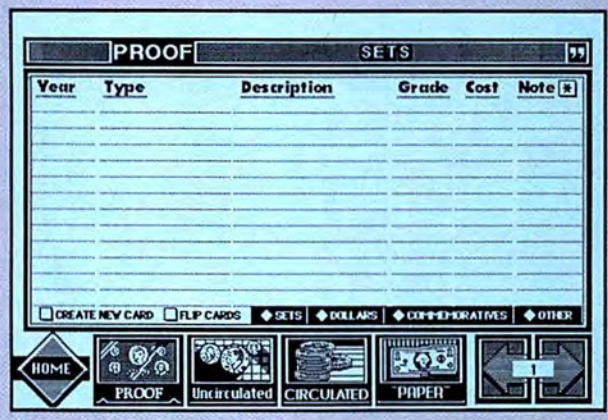


Click on the letter D and hear a dog bark. Click on P and watch Pinocchio's nose grow. The Alphabet Soup stack uses sound and animation to teach your child the ABCs and numbers from zero through nine. Alphabet Soup is shareware from The Palms Computer Group, 9107 Cypresswood Circle, Tampa, FL 33647; (813) 937-3090; $15.

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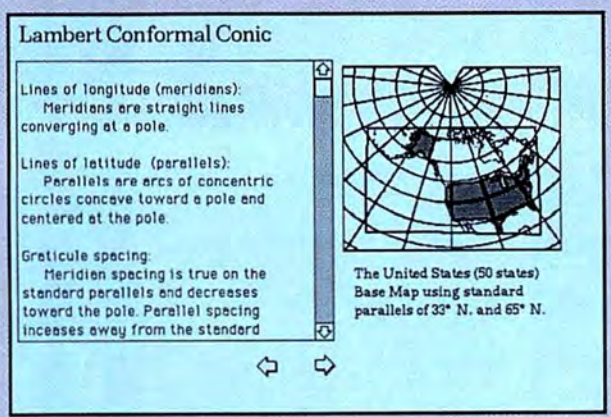


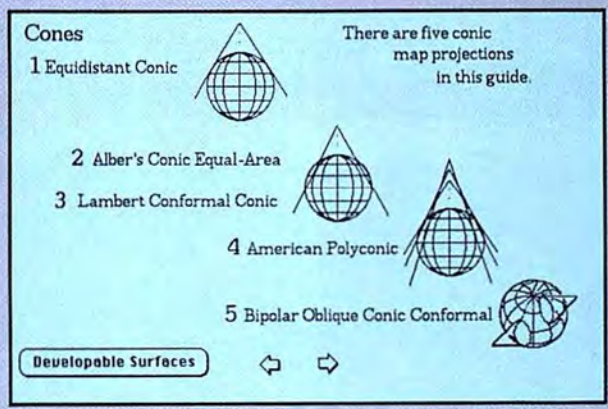
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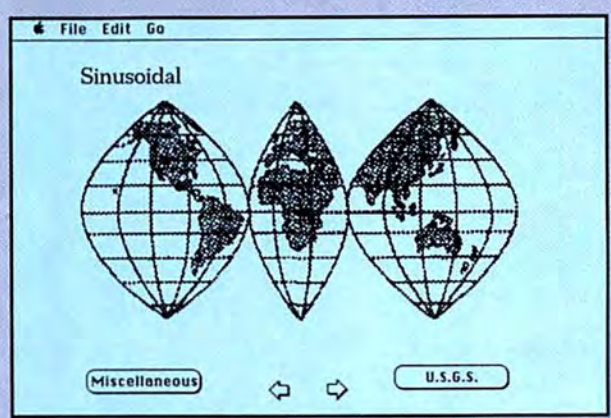


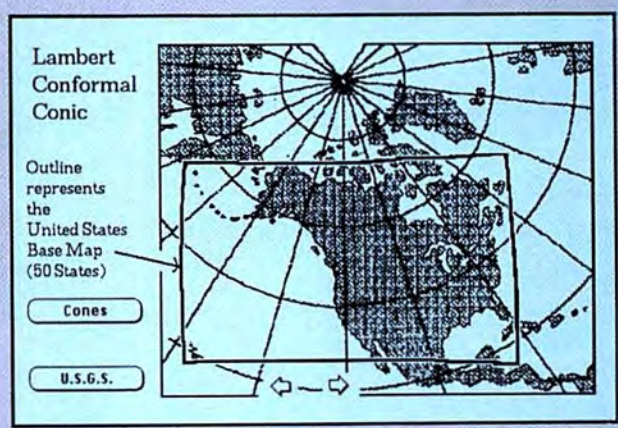
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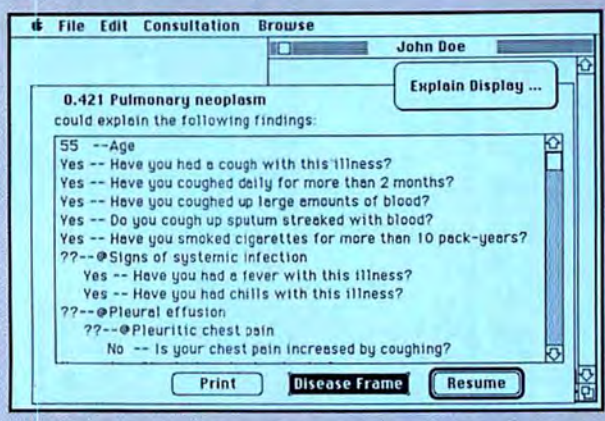




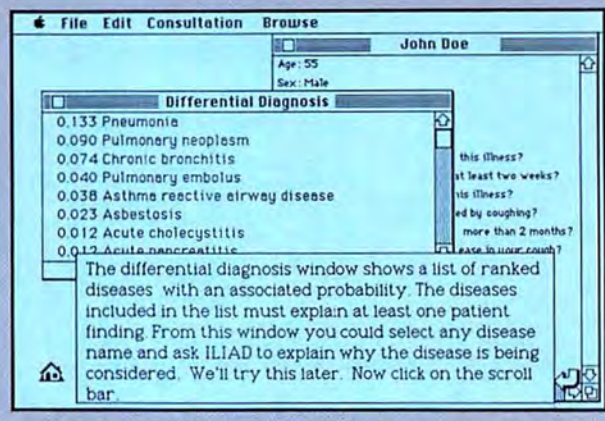


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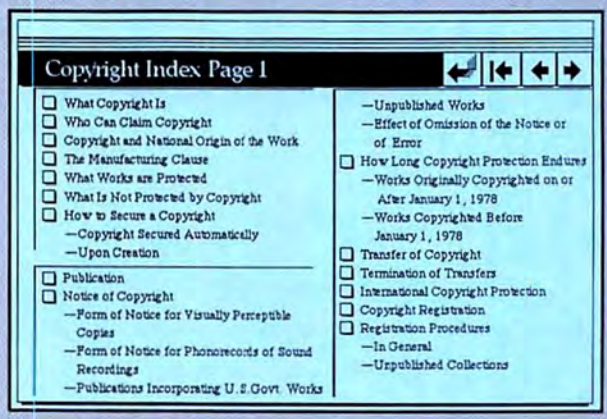


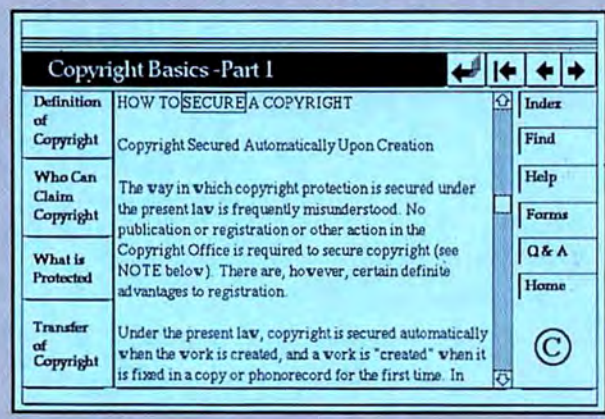
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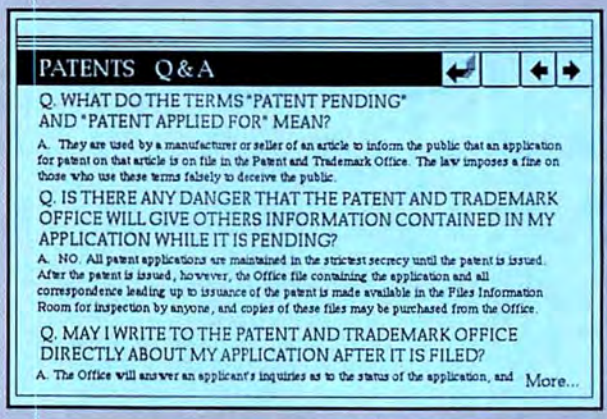


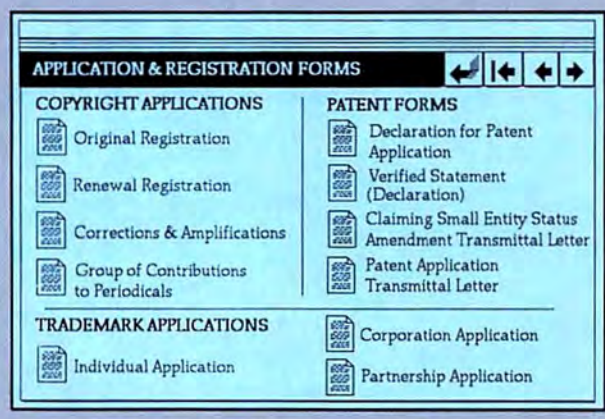
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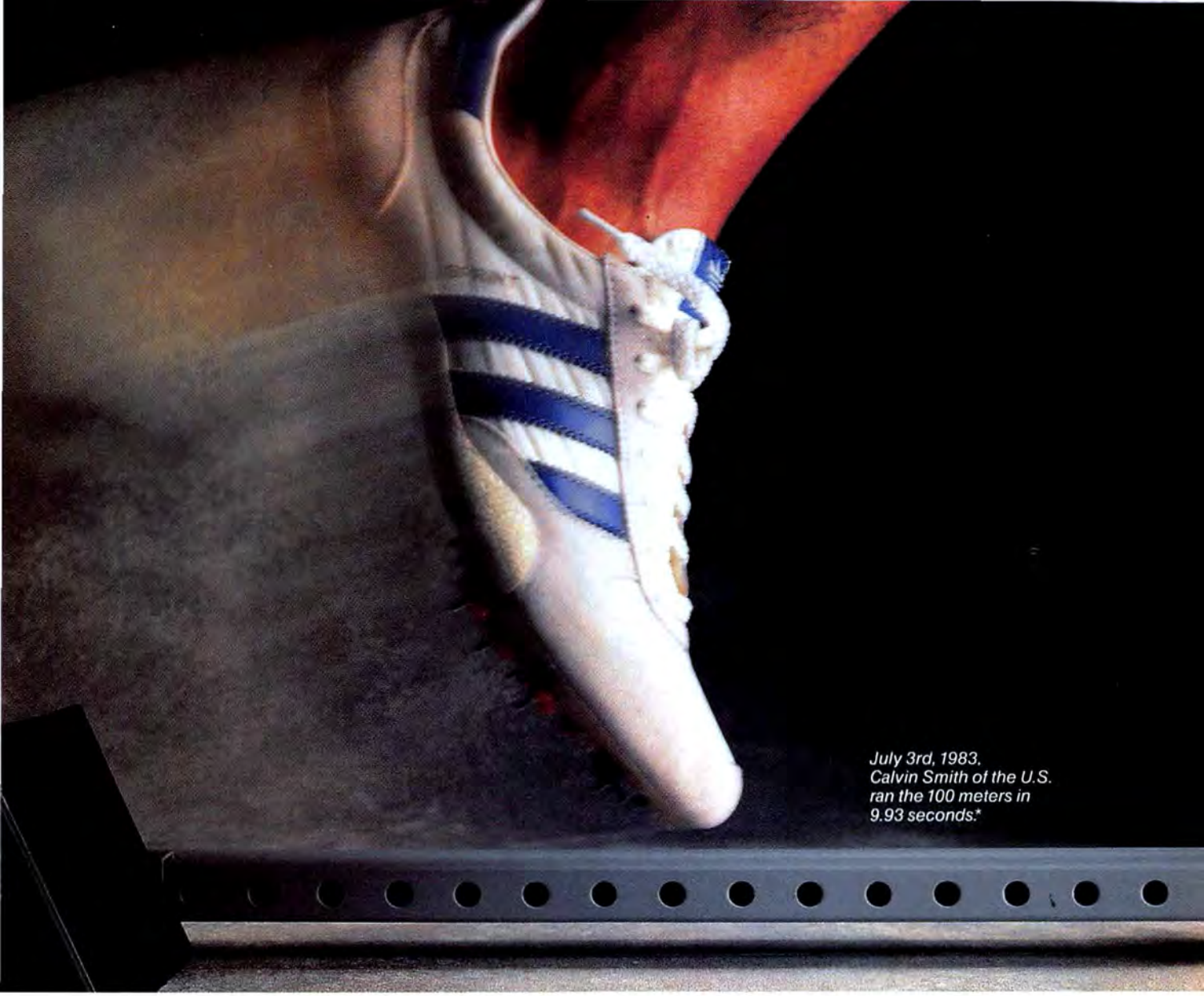








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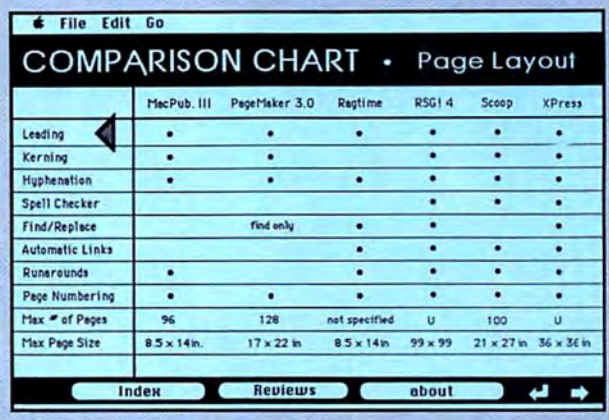
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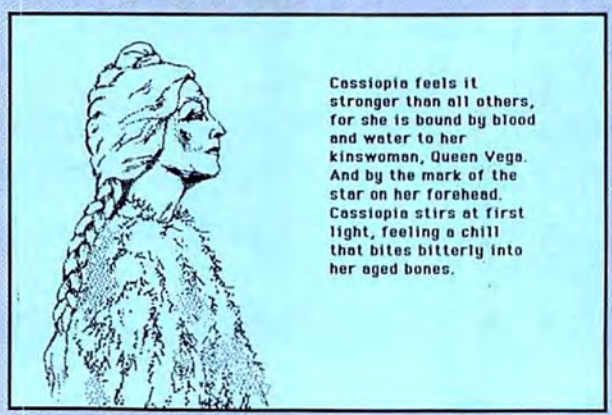
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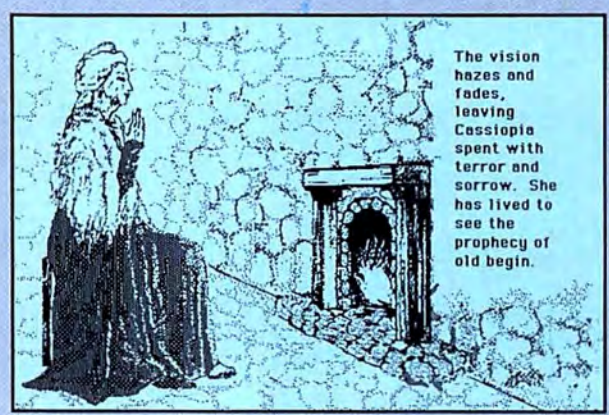




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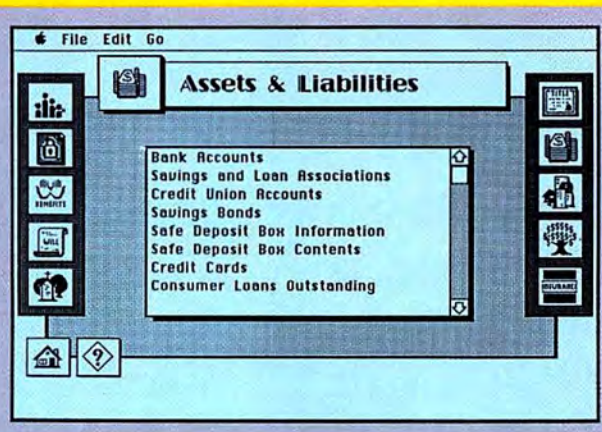
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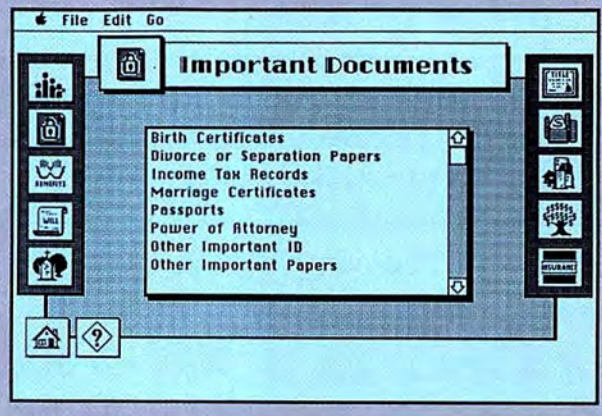
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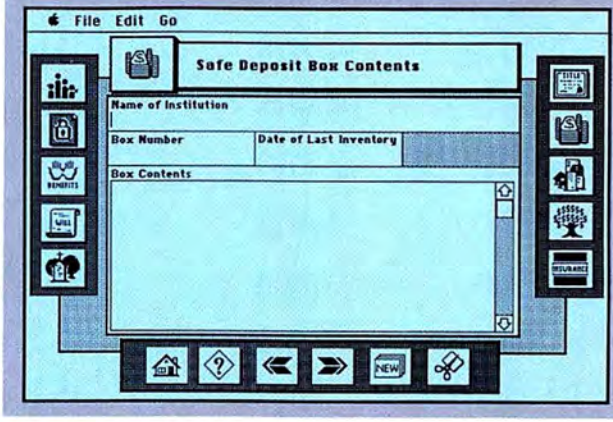
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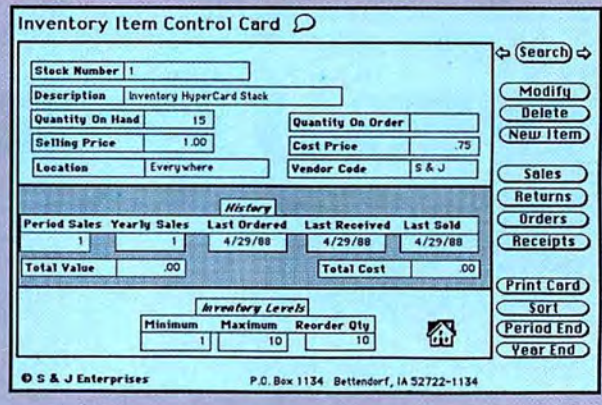






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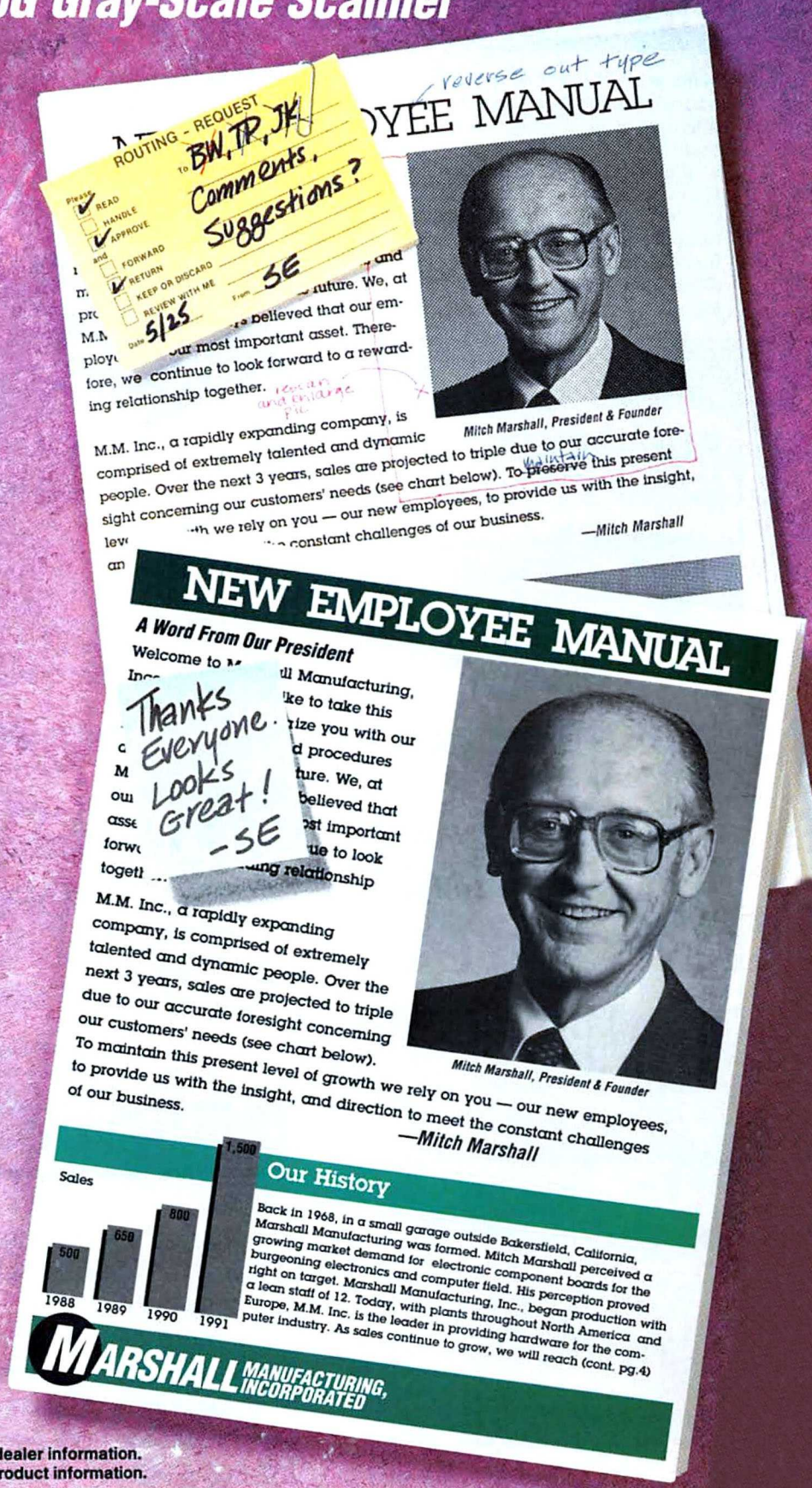


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MINIFINDERS



Have you often wished for a personal assistant to help in picking software? These MiniFinders may not breathe and move, but they do tell you what products are hot and, better, what these products do. Each of these items has been carefully reviewed and selected by the *MacUser* editorial staff. Each has been rated in increments of half mice, from 1 to 5. Ratings are relative within categories, and they can change as categories expand and new products advance the state of the art. You won't see many low ratings or bombs, since we're telling you about the cream of the crop, but we will warn you about the really bad products so that you don't spend your money on them. Red names indicate this month's additions. The letters at the end of the entries indicate whether a product is copy protected (CP) or not (NCP). If a product has been reviewed or Quick Clicked in *MacUser*, the date of the review is shown. Eddy (Editor's Choice) Award winners are noted with a ★ and the year in which they won prizes for an excellent product. Next time you have to find products you can count on, count on *MacUser*!

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Jazz provides well-integrated modules for word processing, graphs, ŧŧŧŧ worksheets, databases, and communications. HotView is best feature. Requires 512K+ and external drive. Version 1A requires 400K drive. $395. Lotus, 55 Cambridge Parkway, Cambridge, MA 02142. CP (Prem)

Microsoft Works is an integrated application that includes word ŧŧŧŧ½ processing, database, spreadsheet, and telecommunications functions. The telecommunications module includes both background up- and downloading. $295. Microsoft, 16011 NE 36th Way, Redmond, WA 98073-9717. NCP (Oct 86) ★'86 Eddy

Trapeze (version 2.0) is a powerful presentation worksheet that ŧŧŧŧ½ combines mathematical functions and graphic representation. The interface, which consists of an icon bar, can be awkward to use. Mac II and color supported. $395. Access Technology, 555C Heritage Harbor, Monterey, CA 93940. NCP (Dec 87)

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BPI General Accounting is an easy-to-use system. Six journals, ŧŧŧŧ AR, AP, Payroll, and GL on one disk. Offset amounts automatically post to ledgers. Up to 8000 accounts. Detailed records, wide range of reports. Switcher and HFS compatible. $249. Requires 512K+. BPI Systems, 3001 Bee Cave Rd., Austin, TX 78746. NCP (Aug 86)

Insight is a high-powered accounting program for the small-to- ŧŧŧŧ½ medium-sized business. Modules include Accounts Receivable, Payables, and General Ledger; others are in the works. Requires 512K and hard disk. $595. Layered, 529 Main St., Boston, MA 02129. NCP (Dec 86) ★'86 Eddy

Rags to Riches integrated accounting modules (General Ledger and ŧŧŧŧ½ Accounts Receivable) uses Mac interface to the hilt. Information entered in one window automatically transfers. Detailed, flexible report options. Very easy to use, but it can be confusing with several windows on screen. Requires 512K+ and printer. $199.95 per module. Chang Labs, 5300 Stevens Creek Blvd., San Jose, CA 95129. NCP (Dec 85)

Rags to Riches Professional Billing tracks and bills professional ŧŧŧŧ services. Batches activities for individual timekeepers. Use as standalone, or integrate with R to R modules. Requires 512K+, printer. $399.95. Chang Labs, 5300 Stevens Creek Blvd., San Jose, CA 95129. NCP (Feb 87)

Simply Accounting has 6 ledgers and 8 journals to handle the ŧŧŧŧ needs of most small-to-medium sized businesses. Better Mac interface than most accounting packages. Unfortunately, payroll tax labels can't be modified, which forces you to subscribe to Bedford's yearly update service. Version 1.03. Requires 1 M. Mac II and MultiFinder friendly. $349. Bedford Software, 15311 Northeast 90th St., Redmond, WA 98052. NCP (Sept 88)

Strictly Business General Ledger features clear, well-outlined set- ŧŧŧŧ up procedures and operations. Very flexible, up to 99 profit centers with up to 100 departments each, and customized reports. Program print spools. Requires 512K+, printer and external drive. $395. Future Design, 13681 Williamette Dr., Westminster, CA 92683. NCP (Dec 85) ★'85 Eddy

Timeslips III tracks billing and expense information for people who ŧŧŧŧ½ charge by the hour. DA turns the clock on and automatically bills a client when a session is over. Version 1.06. Requires 512K and two disk drives. Mac II and MultiFinder friendly. $199.95. North Edge Software, 239 Western Ave., Essex, MA 01929. NCP (Sept 88)

PERSONAL FINANCE

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MINIFINDERS



$149.95. Monogram, 8295 S. La Cienega Blvd., Inglewood, CA 90301. CP (Mar 87)

Easy Checks puts your check register (or credit card records or any ½ other simple financial account) into a desk accessory. Creating formats is rough, can't save reports to disk and there's no LaserWriter support. Requires 512K+. $44.95. PAR Software, PO Box 1089, Vancouver, WA 98666. NCP (Apr 88)

MacInTax is an excellent tool for preparing tax forms. Intuitive, easy ★★★★★ to use. Accepts data from leading personal finance programs. Good built-in help. Liberal upgrade policy for current owners. California forms set also available. $119 federal; $65 California. SoftView, 4820 Adohr Lane, Suite F, Camarillo, CA 93010. NCP (Mar 87) ★'86 Eddy

MacMoney is a financial manager that uses information gleaned ★★★★ from your checks and deposit slips. Produces a variety of reports and graphs. Requires 512KE and printer. Version 3.1 reviewed. $119.95. Survivor Software, 11222 La Cienega Blvd., Inglewood, CA 90304. NCP (Jul 88) ★'86 Eddy

Wall Street Investor spots stock market trends. Downloads infor- ★★★★ mation from an electronic service. Good charting ability. Previously known as Market Pro. Version 2.1. Requires 1 megabyte, two 800K drives or hard disk, and an I.P. Sharp account. $495. Pro Plus Software, 2150 East Brown Road, Mesa, AZ 85203. NCP (Oct 88)

DATABASES

Business Filevision is a masterpiece of Macintosh programming, ★★★★ the only true graphic database on any micro. Much more powerful than the original, accepts MacPaint graphics. $395. Marvelin, 3420 Ocean Park Blvd., Santa Monica, CA 90405. NCP (Feb 86)

C.A.T. is a dedicated relational database for managing contacts, ★★★½ activities and time. Links between types of data make it easy to keep track of important people and events. $399.95. Chang Laboratories, 5300 Stevens Creek Blvd., San Jose, CA 95129. NCP (Nov 87)

dBase Mac is a relational DBMS that includes a structured pro- ★★★½ gramming language to develop standalone applications. Palette icons as alternatives to menu commands will help novice users. Requires 1M+. $495. Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1319. NCP (Feb 88)

Double Helix II is a powerful database that supports a multiuser ★★★★½ environment with an upgrade. Uses an icon-based development system for easy creation of databases. $595, single user version. Odesta, 4084 Commercial Blvd., Northbrook, Ill 60062. NCP (Apr 88)

File is a flexible data manager. Creates files for a variety of data, ★★★½ including simple graphics. Files are created in simple row/column format, but reports and forms are easily customized. $195. Microsoft, 16011 NE 36th Way, Redmond, WA 98073-9717. CP

FileMaker Plus retains features of FileMaker and reads FileMaker ★★★★★ data, also displays up to 8 files, uses "lookup" to retrieve data from other files. Enhanced calculation with many additional functions. Scripts automate a sequence of actions. Requires 512K+. $295. Nashoba Systems, 1157 Triton Dr., Foster City, CA 94404. NCP (Nov 86) ★'86 Eddy

4th Dimension is a versatile tool that creates standalone relational ★★★★½ databases. Design and layout environments allow easy linking of information. Robust. Pascal-like procedure language. $695. Acius, 20300 Stevens Creek Blvd., Cupertino, CA 95014. NCP (Nov 87) ★'87 Eddy

FoxBASE+/Mac is a relational database that can read unmodified ★★★★½ dBASE III Plus applications created in the MS-DOS world. Amazingly fast. Good implementation of dBase on the Mac. Version 1.0. Requires 1M. Mac II and MultiFinder friendly. $395. 118 W. South Boundary, Perrysburg, OH 43551. NCP (Sept 88)

MacDewey! (version 2.5) is a cataloging program featuring the ★★★ Dewey Decimal Classification system. Uses predefined fill-in-the-blank fields to create catalog cards. Suffers from bugs in search routines and the inability to distinguish first names. Not for professionals; home libraries might benefit. $79.95. Mousetrap Software, 336 Coleman Dr., Monroeville, PA 15146. NCP (Nov 87)

Omnis 3 is a power database, featuring concurrent-multiple-file ★★★★ management. Can handle 24 files, 12 at a time, and is fully relational. Create custom environments, including user-defined menus, commands, and dialogs. $495. Blythe, 2929 Campus Dr., San Mateo, CA 94403. NCP (Mar 86)

OverVUE is a power-packed relational database that has extensive ★★★★½ sorting, summarizing, and report generation capacity. Has macros, and a charting function. Good manual. It can exchange files with a very wide variety of other programs (including IBM software). $295. ProVUE, 222 22nd St., Huntington Beach, CA 92648. NCP (Nov 85) ★'85 Eddy

Professional Bibliographic System is a specialized database for ★★★★ storing and retrieving bibliographies. Redesigned templates (20) simplify creation. Version 2.6 offers improved speed, flexible formatting. $295. Personal Bibliographic Software, Box 4250, Ann Arbor, MI 48106. CP (Feb 87)

Record Holder is a flexible, easy-to-use form-oriented data manag- ★★★★ er. Setup is particularly simple and the search features are powerful. $69.95. Software Discoveries, 137 Krawski Dr., South Windsor, CT 06074. NCP (Apr 86) ★'87 Eddy

Reflex for the Mac is a flexible relational database. Excellent report ★★★★½ generator gives full control over appearance, style of output. Requires 512K+, second drive, or hard disk. $99.95. Borland International, 4585 Scotts Valley Dr., Scotts Valley, CA 95066. NCP (Dec 86) ★'86 Eddy

Reflex Plus is a relational database with "smart" entry, and report ★★★★ design, but no overall programming facility. Simple to set up, yet fast. Graphic capabilities are quite limited. Version 1.0 reviewed. $279. Borland/Analytica, 4585 Scotts Valley Dr., Scotts Valley, CA 95066-9987. NCP (Feb 88)

Writer's Workshop maintains orderly records for writers. It can ★★★½ track manuscripts, income, and publisher. Based on and includes Runtime Helix. $99.95. Futuresoft System Designs, PO Box 132, New York, NY 10012. NCP (Apr 87)

NUMBER CRUNCHING

DesignScope is a construction kit for digital and analog circuits. Up ★★★★ to 254 components can be utilized in a single circuit, and the equivalent of a dual-trace oscilloscope plots output in real-time. Good for testing circuitry without touching a breadboard. $249.95. BrainPower, 24009 Ventura Blvd., Calabasas, CA 91302. NCP (Nov 86)

Excel is THE power spreadsheet. Of the Mac, of the world. Has 256- ★★★★★ column by 16,384-row capability. Features include a powerful macro function (with a recorder to make creation simple) and elaborate charting facilities. 512K+ Mac and external drive required. $395. Microsoft, 16011 NE 36th Way, Redmond, WA 98073-9717. NCP (Prem) ★'85 Eddy

MacCalc is a fast, competent, full-featured spreadsheet with im- ★★★★ pressive built-in functions, font control, on-line help, ability to expand columns and rows, and read/write SYLK or WKS files. The worksheet is 125 columns by 999 rows. A very flexible, pure spreadsheet. $139. Bravo Technologies, c/o DPAS, PO Box T, Gilroy, CA 95021. NCP (Sep 86) ★'86 Eddy

MacSpin is a unique and powerful graphic data analysis program. ★★★★ Handles multivariate data in a highly visual manner. Nothing else like it for any micro. $199.95. D² Software, PO Box 9546, Austin, TX 78766-9546. CP (Jun 86) ★'87 Eddy

MacSQZ! compresses Excel files up to 88% of their actual size. ★★★★★ Good to free up disk space. Also contains password utility.

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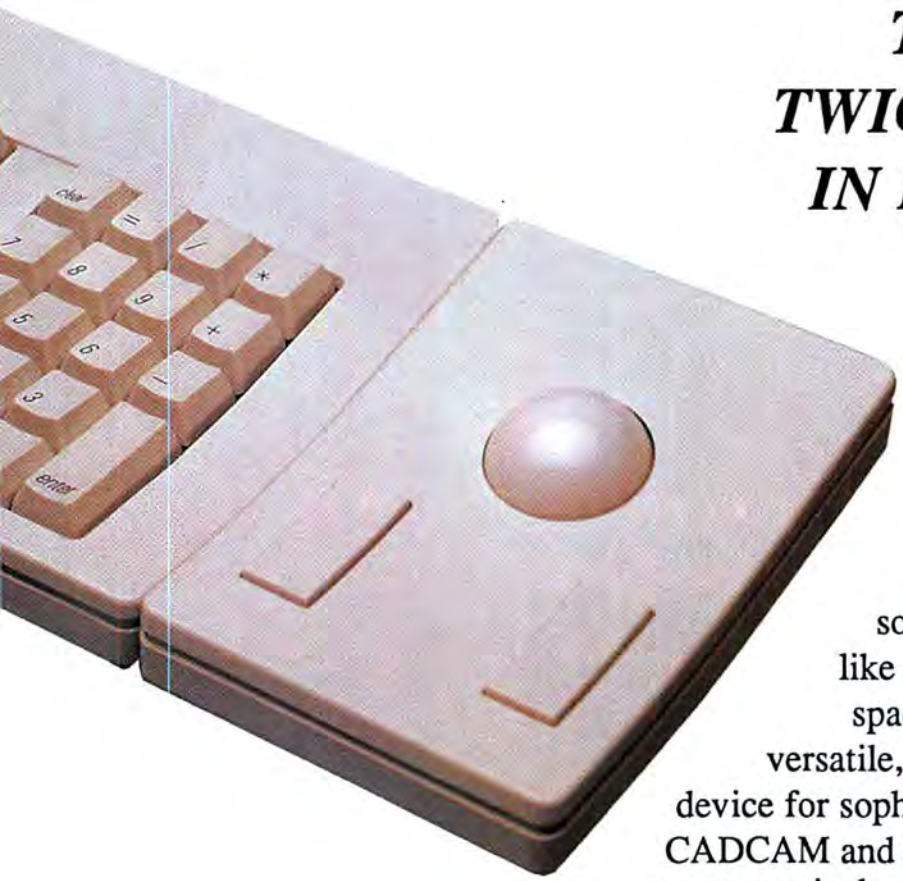
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MINIFINDERS



MultiFinder hostile. Requires Excel. Version 1.01. $79.95. Turner Hall Publishing, 10201 Torre Ave., Cupertino, CA 95014. NCP (Aug 88)

MathView Professional is an equation solver that combines two- and three-dimensional plotting with routines for matrices, differential equations and integrals, complex numbers, and the like. Interface leaves a lot to be desired. Version 1.0. Requires 512KE and two disk drives. Mac II and MultiFinder friendly. $249.95. BrainPower, 24009 Ventura Blvd., Calabasas, CA 91302. NCP (Sept 88)

Microtemp Financial Calculators is a set of worksheets for Excel and Works that calculates common personal and small business financial problems. Includes cash flow, real estate and rate of return calculators. Version 1.0.$79.95. Microtemp, P.O.Box 1208, Santa Rosa, CA 95402. NCP (Aug 88)

Mindsight is a professional level, decision-support, and business planning package. Can work with IFPS on mainframes, and is able to transmit models in both directions. Powerful and easy to use. Requires 512K+. $249. Execucom Systems, PO Box 9758, Austin, TX 78766. CP (Dec 86)

Multiplan, the first Mac product from someone other than Apple, is beginning to show its age. Still a very capable basic spreadsheet with simple sorting, 63 columns by 255 rows, many built-in functions, other standard spreadsheet features. $195. Microsoft, 16011 NE 36th Way, Redmond, WA 98073-9717. CP (Mar 86)

Parameter Manager Plus is a data manager, incorporating integrated scheduling, statistics, and graphics. It has solid spreadsheet, calendar, and database functions and reports can be customized using other software. Parameter Manager can also import data from Excel or Lotus 1-2-3. $395. Rebus, 2330-B Walsh Ave., Santa Clara, CA 95051. NCP (Jul 87)

StatView II is a remarkably complete data analysis package. Essential for any kind of descriptive, comparative, or multivariate statistics. Works in color on the Mac II. Version 1.01. Requires Mac II or SE equipped with 68020 and 68881 math coprocessor; two 800K disk drives or hard disk. $495. Abacus Concepts, 1984 Bonita Avenue, Berkeley, CA 94704. NCP (Oct 88)

101 Macros for Excel offers all the power of macros without having to learn how to write them. Some gems include a macro to transpose rows and columns, and a search and replace macro. Requires Excel. $69.95. Macropac International, 19855 Stevens Creek Blvd., Cupertino, CA 95014. NCP (Jul 88)

GRAPHICS & DESIGN

ArtWare: Borders enables you to customize your own clip art disk. The border collection is the best package in terms of quality of art. Other packages available. Requires a program that reads Encapsulated PostScript files. $129. Artware Systems, 3741 Benson Dr., Raleigh, NC 27609. NCP (Aug 88)

CalendarMaker creates monthly calendars in a variety of formats. Users can incorporate their art and daily notes. Note files can be imported from a variety of DA calendars and outliners. Shareware and prelicensed versions available. $49.95 CE Software, 1854 Fuller Road, West Des Moines, IA 50265. NCP (Dec 86)

Canvas is a Draw and Paint program that uses QuickDraw as its output language. Full of features, including free rotation and one-and-two-point perspective. Also has graphics macro commands, unusual in a program this inexpensive. $295. Deneba, 7855 N.W. 12th St., Suite 202, Miami, FL 33126. NCP (Jan 88)

Chart can easily create area, bar, column, line, pie, scatter, and combination charts. A total of 42 styles are provided. Limited to 100 data items (64 in a series) on a 128K Mac, approximately twice that on a 512K Mac. $125. Microsoft, 16011 NE 36th Way, Redmond, WA 98073-9717. CP

Click & Clip offers seasonal graphics packages. Of the two quarterly editions released, the Spring '88 package is the better collection. Requires a program that reads Encapsulated PostScript (EPS) files. $39.95 per edition. Studio Advertising Art, P.O. Box 18432-52, Las Vegas, NV 89114. NCP (Aug 88)

ColorPrint allows you to print FullPaint, MacPaint, MacDraw, and MacDraft documents in color using the ImageWriter II or ImageWriter I. Paint files set up as overlays are read into ColorPrint, and the program controls proper positioning registration. $29.95. I/O Design, PO Box 156, Exton, PA 19241. NCP (Mar 86)

Comic Strip Factory is an assembly program for creating comic strips. Includes a database of parts for various characters and backgrounds for panels. Good text editing in balloons. Can import and export in MacPaint format. $69.95. Foundation Publishing, 5100 Eden Ave., Edina, MN 55436. NCP (Dec 87)

Cricket Draw is an object-oriented drawing program that will produce stunning, high-quality output. Designed to print on PostScript-compatible devices, such as the LaserWriter. Making shadows and flowing fountain effects is just a point and click away. $295. Cricket Software, 30 Valley Stream Pkwy., Malvern, PA 19355. NCP (May 87)

Cricket Graph easily generates 12 graph types. Multiple windows can be displayed. Graph prints in up to eight colors with up to 16 patterns. Self-generating macro formatting. Switcher, HFS, LaserWriter, and plotter compatible. $195. Cricket Software, 30 Valley Stream Pkwy., Malvern, PA 19355. NCP (Jun 86) ★'86 Eddy

Cricket Presents creates desktop presentations in the form of overhead transparencies, slides, or even on the Mac itself. Modem files to Autographix Imaging Service for overnight color slides. Good chart and graph capability; poor text handling. Version 1.0. Requires 1M and a hard drive. Mac II friendly. $495. Cricket Software, 40 Valley Stream Pkwy., Great Valley Corporate Center, Malvern, PA 19355. (Sept 88)

Crystal Paint creates an electronic kaleidoscope. It is MacPaint's Brush Mirrors gone wild in a small, simple, yet wonderful application. Does not work in color on Mac II. MultiFinder friendly. Requires 512K+. $49.95. Great Wave Software, 5353 Scotts Valley Dr., Scotts Valley, CA 95066. NCP (Feb 88)

Curator catalogs your art and graphics so it's easy to see what's what and where it is. Supports PICT, TIFF, EPSF, PostScript, MacPaint, and more. Changes creator types. Requires 512K and an 800K drive. $139.95. Solutions International, 29 Main St., Montpelier, VT 05602. NCP (Sep 88)

DeskPaint is a full-blown paint program as a desk accessory. Allows you to spruce up a graphic while in another application. Imports and exports MacPaint and TIFF images. Great for DTP, but not enough features to rival the leaders in paint programs. Zedcor, 4500 E. Speedway, Tucson, AZ 85712-5305. NCP (Mar 88)

"Draw It again, Sam..." v. 1.03 is an object-oriented graphics program, like MacDraw, that adds such useful wrinkles as layered drawing, on-screen libraries, and color. Manual is weak. Requires 512K+ and an 800K disk drive. $150. Aba Software, PO Box 850, Frazer, PA 19355. NCP (Feb 88)

Easy3D is a three-dimensional, solid modeling masterpiece. Four variable light sources, powerful sculpting tools, and an exquisite user interface make this a must-have for graphics enthusiasts. Requires 512K+. $149. Enabling Technologies, 600 S. Dearborn, Chicago, IL 60605. NCP (May 86)

EPS Illustrations is a potpourri of illustrations with no real focus. As an art package, this one is not very useful as you cannot alter any of the drawings. Requires a program that reads Encapsulated PostScript (EPS) files. $129.95. T/Maker, 1973 Landings Drive, Mountain View, CA 94043. NCP (Aug 88)

MINIFINDERS



EZ Draft is a high-level CAD application. Does things usually only ★★★ found on minicomputer programs. Uses "pop-up" menus to supplement a full set of pull-down menus. Comes with an additional set of printer/plotter/monitor drivers. A real powerhouse. $1995. $500 for IEGS module to link to other CAD programs. Bridgeport Machines, 500 Lindley St., Bridgeport, CT 06606. CP (May 87)

FastForms! Construction Kit is both a fast and efficient business ★★★★★ forms creator (a drawing program) and a specialized application (and DA) to fill out the data fields in your forms. $149 (US). Shana Enterprises, Advanced Technology Center #105, 9650-20 Ave. Edmonton, Alberta T6N 1G1, Canada. NCP (Nov 87)

Fluent Fonts is a two-disk collection of fonts. Forty-nine different ★★★★ items are included. All install easily in user systems. Most are well executed and some are extraordinarily nice. This is a real bargain for font lovers. $49.95. CasadyWare, PO Box 223779, Carmel, CA 93922. NCP

Fontastic is the best font editor now available for the Mac. Features ★★★★½ a large editing window with a grid to make positioning easy. Select letters to edit by clicking on a matrix of the font. Allows scaling of existing fonts and previewing the various styles. $49.95. Altsys, PO Box 865410, Plano, TX 75086. NCP (Dec 85)

Fontographer is a complex, but excellent laser font creator. The ★★★★½ fonts created have 300 bits-per-inch resolution. The fonts are actually downloadable PostScript files. $395. Altsys, PO Box 865410, Plano, TX 75086. CP

FreeHand greatly simplifies the drawing of curves, the use of layers ★★★★½ and text handling when manipulating PostScript graphics. And it works in color on the Mac II. Requires 1M and 2 disk drives. $495. Aldus, 411 1st Avenue South, Seattle, WA 98104. NCP (Aug 88)

FullPaint is an expanded version of MacPaint. Features include full- ★★★★★ screen drawing, multiple documents opening simultaneously, brush editing, movable tool palettes, special text effects, and much more. It fills the gaps left by MacPaint. $99.95. Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1319. NCP (Jun 86) ★'86 Eddy

GraphicWorks 1.1 is a powerful drawing and painting program that ★★★★ creates high-resolution bit-maps. Easels contain graphics, balloons hold text, and both reside on panels. Graphic primitives are now a separate tool. $149.95. Mindscape, 3444 Dundee Rd., Northbrook, IL 60062. NCP (Oct 87)

Graphidex indexes MacPaint and MacDraw format graphics without ★★½ removing them from their original documents. Indexed graphics are retrieved via the Graphidex DA. Can modify an indexed graphic without affecting the original. Best for bit-mapped (Paint format) images, but the design is questionable and the execution imperfect. Requires 512K+. $124.95. BrainPower, 24009 Ventura Blvd., Calabasas, CA 91302. NCP (May 87)

GridMaker is a tool for artists who use perspective. The program ★★★ automatically generates a series of three-dimensional plane sets that can be pasted into MacDraw. Sizes and viewing vantage points are easily modified. $49. FolkStone Design, PO Box 86982, North Vancouver BC V7L 4P6, Canada. NCP (Nov 86)

Illustrator 88 is a professional-level graphics program from the ★★★★½ people who defined the PostScript language. Uses templates for precise drawing and detailed artwork. Requires 1 megabyte. $495. Adobe Systems, 1585 Charleston Road, Mountain View, CA 94039. NCP (Oct 88)

Image Club is an overwhelming collection of EPS clip art available ★★★★★ on disk and CD-ROM. Comes with a well-designed catalog of images. Requires a program that reads Encapsulated PostScript (EPS) files. $99. Image Club Graphics, 2915 19th St. NE, Calgary, Alberta, Canada T2E 7A2. NCP (Aug 88)

Image Studio puts a photo-retouching lab on the desktop. Editable ★★★★★ brushes let you modify digitized images in 65 gray levels. Requires 1M+ and two 800K disk drives. Mac II and MultiFinder friendly. Version 1.0 reviewed. $495. Letraset USA, 40 Eisenhower Dr., Paramus, NJ 07653. NCP (Jun 88)

Images with Impact! brings clip art out of the turn-of-the-century ★★★★★ woodcut style and into a modern graphic sensibility. "Graphics and Symbols 1" is the first in a series. Requires a program that reads Encapsulated PostScript (EPS) files. $99.95. 3G Graphics, 11410 NE 124th St., Kirkland, WA 98034. NCP (Aug 88)

Japanese Clip Art is a two-disk set of extraordinary Japanese clip ★★★★½ art. Consists of MacPaint documents and separate fonts. Volume I, Heaven, covers mythological subjects; Volume II, Earth, has secular subject matters. $79.95 each volume; $149.95 set. Qualitas Trading, 6907 Norfolk Rd., Berkeley, CA 94705. NCP (Apr 87)

LaserFonts are new fonts for the LaserWriter. Users download ★★★★ them to their machines. Very high quality and very simple to use. Willamette looks like Avant Garde. MicroFonts provides tiny, expanded, and condensed versions of the LaserWriter's own fonts. $34.95 to $44.95 each. Century Software, 2483 Hearst, #175, Berkeley, CA 94709. NCP

LaserPaint's clumsy interface makes it a slow program. There's ★ good laser output, if you persevere through the creation of a document. The support is scads better than the documentation, which is lousy. Version 1.1.4. $495. LaserWare, PO Box 668, San Rafael, CA 94915. CP (Jan 88)

Lasertalk is a PostScript programming tool that establishes interac- ★★★★★ tive contact with laser printers. Preview window and on-line help make it a powerful tool. Requires 1M+ and a PostScript Printer. $249. Emerald City Software, PO Box 2103, Menlo Park, CA 94026. CP until registered (May 88)

The Mac Art Dept. is a collection of over 150 graphic images ★★★★ ranging from foods to hands holding signs to borders. Best suited for letterheads, memos, other business use. $39.95. Simon & Schuster, Computer Software Div., 1 Gulf + Western Plaza, New York, NY 10023. NCP (Mar 86)

Mac-a-Mug is an Identikit-type program for creating faces from ★★★½ facial feature files. Uses scroll bars that are slow and jerky. Lots of creative fun. 1M+ Mac required. $59.95. Shaherazam, PO Box 26731, Milwaukee, WI 53226. CP (Jul 86)

MacCalligraphy is the best simulation of brush painting in any graph- ★★★★½ ics program. User-designed Seals and Touches enable you to design your own signature tool and the style of brush you use. Comes with a clip art disk. $175. Qualitas Trading, 6907 Norfolk Rd., Berkeley, CA 94705. NCP (Feb 88)

MacDraft is an object-oriented graphics program. It sports ad- ★★★★ vanced features such as variable scaling, single-degree rotation, complex arcs, and a FatBits-like magnification mode. Best used to complement MacDraw, not replace it. $269. Innovative Data Design, 2280 Bates Ave., Concord, CA 94520. NCP (Feb 86)

MacDraw is an object-oriented structured graphics program. Can ★★★★½ be used to design forms, create presentation materials, and do technical illustrations. Drawing sizes up to 8 feet by 10 feet are possible. Text can be easily generated and integrated in the graphics. $195. Claris, 440 Clyde Ave., Mountain View, CA 94043. NCP (Nov 85) ★'85 Eddy

MacModel is an economical 3-D package with shading. Somewhat ★★★ sketchy Mac interface, shading speed slow (but acceptable), grainy image resolution. On-line help screens are a welcome addition. Frequent updates and low price make this a reasonably good buy. $40. A.P.P.L.E. CO-OP, 290 SW 43rd St., Renton, WA 98055. NCP (Aug 86)

MacPaint hasn't lost its shine after all these years. Still one of the ★★★★½ best freehand graphics tools. Version 2.0 supports multiple windows, design templates, and a magic eraser to correct

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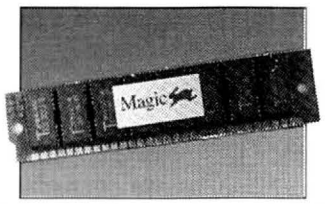
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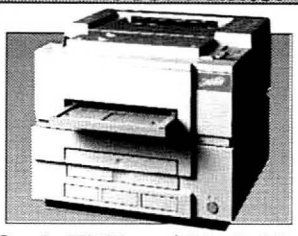
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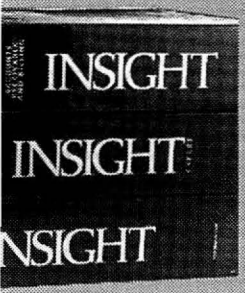


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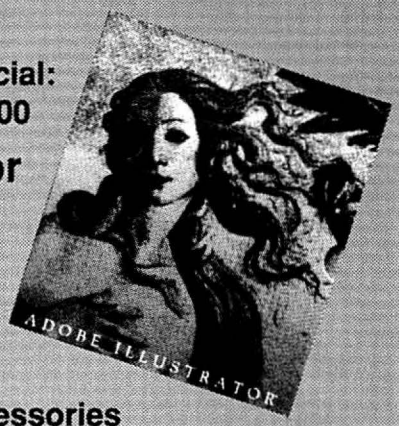
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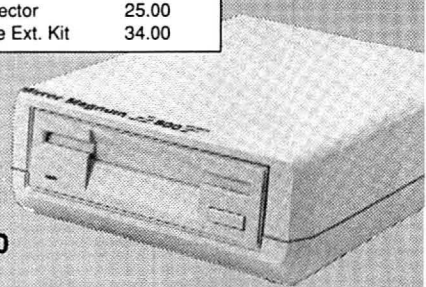
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MINIFINDERS



corrections. Requires 512K and second disk drive. $125. Claris, 440 Clyde Ave., Mountain View, CA 94043. NCP (Jul 88) ★'85,'87 Eddy

Mac3D 2.0 is a feature-laden 3-D program with a MacDraw-like ★★★★ interface. PostScript-resolution shading with six variable light sources, user-definable tools, and many more features make this a powerhouse. $249. Challenger Software, 18350 Kedzie Ave., Homewood, IL 60430. NCP (Jan 87)

MapMaker v.-3.0 is a digital cartographer that charts demographic ★★★★½ and marketing information on a geographic basis. Wide variety of amps available, some at an additional cost. Requires 512K. $349. Select Micro Systems, 40 Triangle Center, Yorktown Heights, NY 10598. NCP (Aug 88)

MGMS: Professional CAD for Macintosh offers more than 200 ★★★★ functions. Very complete, capable program. Groups, Dimension, Libraries, etc., are standard. Sometimes confusing — designed for experienced, professional CAD user, not the novice. Full plotter support. 512K+. $799. Micro CAD/CAM, 3230 Overland Ave., Los Angeles, CA 90034. NCP (Nov 87) ★'87 Eddy

MiniCad v.-3.0 is a pro-level CAD package. Vast array of features, ★★★★ many accessible only through Command/Shift/Option key combinations. Works in 2-D or 3-D with easy transition from one to the other. MacDraw-like interface makes it easy to learn and use. Requires 512K+. Diehl Graphsoft, 8370 Court Ave., Suite 202, Ellicott City, MD 21043. CP (Oct 87)

Phoenix 3D is an economical 3-D drawing package, with features ★★★★ that belong in a more expensive program. Multiple light sources, fine object placement and orientation control, and a good selection of shapes. $49.95. Dreams of the Phoenix, PO Box 10273, Jacksonville, FL 32247. NCP (Oct 86)

PictureBase is a powerful graphic librarian. You can store paint and ★★★★½ PICT formatted items and attach keywords for later search and retrieval. $69.95. Symmetry, 761 E. University Dr., Mesa, AZ 85203. NCP (Sep 87) ★'86 Eddy

Pixel Paint is a color paint program with customizable palettes and ★★★★½ lots of special effects. Slow OPEN and SAVE. Requires Mac II and 8-bit video card. $495. SuperMac Software, 295 N. Bernardo Ave., Mountain View, CA 94043. NCP (May 88)

Post Art I is a collection of signed originals on disk. Overall, a pretty ★ useless collection in terms of clip art. Meant for hanging prints on a wall. Requires a program that reads Encapsulated PostScript files. $69.95. Olduvai, 7520 Red Rd., So. Miami, FL 33143. NCP (Aug 88)

The Print Shop makes it easy to create greeting cards, signs, ★★★½ banners, and letterheads. Uses its own special graphics and can import Paint files. Hard-disk users get version 1.02 or higher. $79.95. Broderbund, 17 Paul Dr., San Rafael, CA 94903. CP (Sep 87)

Slide Show Magician 1.3 is useful for creating full screen audio-★★★ visual presentations on the Mac. Frame branching, improved editing capabilities, external cassette recorder synchronization, and digitized sound capabilities make this much more powerful than the original. $59.95. Magnum, 21115 Devonshire St., Chatsworth, CA 91311. CP (Mar 86)

Space Edit is a 3-D CAD program. Display shows top, front, side, ★★★½ and axonometric views of an object, all at once or one at a time. Has standard CAD features plus zoom, exploded view, animated flyover. Suppression of hidden lines is very slow. Requires 1M+. $625. Abvent, 9903 Santa Monica Blvd., Beverly Hills, CA 90212. CP (Jul 87)

Storyboarder produces working animated storyboards for use in ★★★★ film and video production. Imports graphics from MacPaint; allows screen masking to simulate television, 35mm or 70mm screen widths; allows limited animation and special effects. $495. American Intelliware, PO Box 6980, Torrance, CA 90504. CP (Nov 86)

SunShine Graphics Library is a collection of 46 400K disks (to ★★★★ date) with a wide variety of high-quality digitized images stored as MacPaint files. $20/disk: discount scale for multiple purchases. SunShine, Box 4351, Austin, TX 78765. NCP (Feb 87)

SuperPaint is a powerful, easy-to-use graphics program with all the ★★★★★ best features of MacPaint and MacDraw — and then some. LaserBits provides 300 dpi magnification and there are 40 editable brush shapes. Requires 512K+. $149.95. Silicon Beach, 9580 Black Mountain Rd., PO Box 261430, San Diego, CA 92126. NCP (Feb 87) ★'87 Eddy

TrueForm takes a scanned image of a paper form and turns it into ★★★★½ an electronic equivalent, complete with fields for entering data. It can automatically sum numeric fields. Requires external 800K drive. $495; run-time version, $295. Spectrum Digital Systems, 2702 International Lane, Madison, WI 53704-3122. NCP (May 88)

VersaCAD is a powerful CAD program that doesn't show any of its ★★★★ MS-DOS roots. Excellent element manipulation, full plotter support. Library user interface is crude. Requires 1M+. $1995. VersaCad, 2124 Main Street, Huntington Beach, CA 92648. NCP (Jul 88)

VideoWorks II is an easy-to-use animation tool — the best available ★★★★½ on the Mac. Has an Overview mode that acts as a slide show carousel for presentations. Works in color on the Mac II. $195. Requires 1M+ and an 800K drive. MacroMind, 1028 W. Wolfram, Chicago, IL 60657. NCP (Mar 88) ★'85, '87 Eddy

VideoWorks II Clip Animation, Clip Charts, Black and White Mov-★★★★ ies, and Clip Sounds are four separate aids to help you construct movies and business presentations. Requires VideoWorks II. $49.95 to $59.95. MacroMind, 1028 W. Wolfram, Chicago, IL 60657. NCP (Aug 88)

WetPaint consists of two 3-disk volumes of very high quality clip ★★★★★ art. Also includes the Art Roundup DA, a good art browser/editor. Volume 1 or 2, $39 each; both volumes, $59. Available in PictureBase format for $15 extra per volume. Dubl-Click Software, 18201 Gresham St., Northridge, CA 91325. NCP (Sep 87)

World-Class Fonts! comes in two volumes of three disks each. ★★★★½ Includes all the Mac the Knife fonts and a lot more, including two useful utilities. This is now the best collection of ImageWriter fonts available. Each volume: $39; both volumes: $59. Dubl-Click Software, 18201 Gresham St., Northridge, CA 91325. NCP (Dec 86)

DESKTOP PUBLISHING

Interleaf Publisher is a speedy multiuser layout system for produc-★★★½ ing large, complicated documents. Has strong global formatting ability but can't use downloadable fonts. Requires Mac II with 5M of RAM and 40M hard disk, $2495. Interleaf, 10 Canal Park, Cambridge, MA 02141. NCP (May 88)

JustText is a professional level word processor and page makeup ★★★½ program that generates PostScript output. Comes with a set of LaserWriter utilities that allow total manipulation of art and text. Requires LaserWriter or other PostScript compatible output device. $195. Knowledge Engineering, GPO Box 2139, New York, NY 10116. NCP (Dec 85)

MacTEX (v. 2.0) is the TeX environment of choice for hardcore TeX ★★★½ users on the Macintosh. Very intimidating for others. Painfully slow and visually unattractive. Requires 1M+. $750. FTL Systems, 234 Eglington Ave. East, Toronto, Ontario M4P 1K5, Canada. NCP (Apr 88)

PageMaker v. 3.0 retains its paste-up approach to page layout. ★★★★★ New features include auto text flow, style sheets, and spot color support. The standard keeps getting better. Requires 1M+ hard disk. $595. Aldus, 411 First Ave. South, Seattle, WA 98104. NCP (Aug 88) (★) '85, '87 Eddy.

FROM THE DUBL-CLiCK COLLECTION



MacUser gave WetPaint 5 mice (Sept. 1987) saying "...the WetPaint art is almost a must for clip art users; the ArtRoundup desk accessory is a neccessity." Volumes marked with ✳ were previously released as "MacMemories."

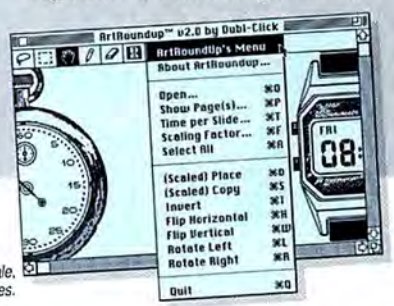
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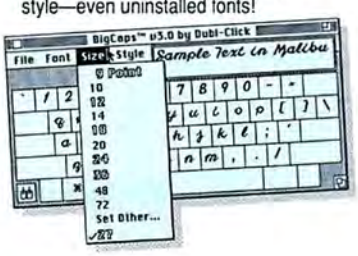
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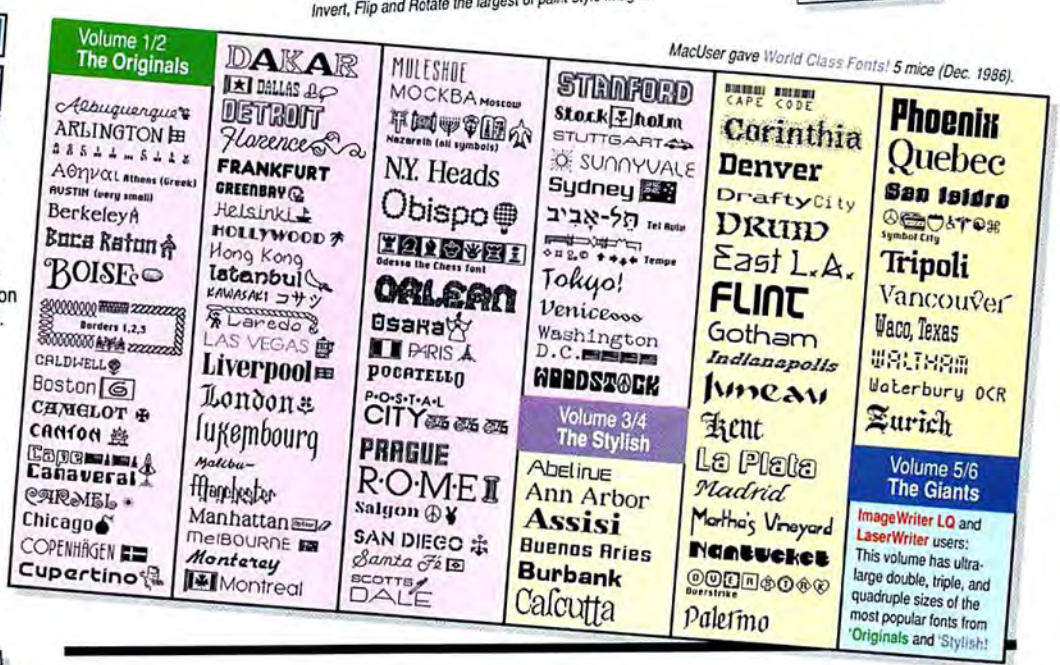
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Portfolio: Designs for Newsletters provides over 20 templates for ♦♦♦♦ 2-page newsletters with pre-set columns, headlines, graphics, and captions. Documentation provides excellent tutorial in page design. Requires 512K+; PageMaker. $79.95. Aldus, 411 First Ave. S., Suite 200, Seattle, WA 98104. NCP (May 87)

QuarkXPress is a high-end desktop publishing application. Layout ♦♦♦♦½ is done in block format; powerful lining tool ties blocks together. $695. Quark, 200 S. Jackson, Denver, CO 80209. NCP (Sep 87)

Ragtime is an "Integrated Page Processor" with text, graphics, and ♦♦♦♦ built-in spreadsheet. Flow text automatically from one frame to another. Spreadsheet has a full set of functions. Excellent, easy-to-use program. Requires 512K+. $395. Orange Micro, 1400 N. Lakeview, Anaheim, CA 92807. NCP (Aug 88)

Ready, Set, Go! 4 has an elegant interface and excellent manual. ♦♦♦♦½ Powerful text wraparounds, fast word processor with hyphenation and spelling check and custom stylesheets. Requires 1M+. $495. Letraset, 40 Eisenhower Dr., Paramus, NJ 07652. NCP (Feb 88) ★'86 Eddy

TeXtures (v. 1.0) is an implementation of TeX, the big daddy of ♦♦♦ typesetting programs. Good for people trained on mainframes in the early days. Otherwise very sticky with a high learning curve. Requires 512K+. $495. Kellerman & Smith, 534 S.W. 3rd Ave., Portland, OR 97204.. NCP (Apr 88)

COMMUNICATIONS

AppleShare is the long-awaited file sharer from Apple. Software- ♦♦♦♦ based, AppleShare requires you to dedicate a Mac and a hard disk to run it. Allows users on the network to protect things from other users on the folder level. Interface to network is provided at a revised Finder. $799. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP (May 87)

ComServe allows you to share a Hayes-compatible modem over an ♦♦♦♦ AppleTalk network. You can call out, but you can't call in. Works with most telecommunications packages. $195 per server. Infosphere, 4730 SW Macadam Ave., Portland, OR 97201. CP (Feb 88)

Desktop Express is a simple-to-use, semi-automated program for ♦♦♦½ using MCI Mail and Dow Jones News/Retrieval. Performance is traded off for ease of use. Requires 512K+. $149. Dow Jones, PO Box 300, Princeton, NJ 08543. NCP (Jan 88)

HomePak is a package consisting of HomeTerm, an excellent, sim- ♦♦ ple telecommunications program with strong macro features; HomeFind, an electronic filer as bad as HomeTerm is good; and Apple's Edit, a simple, non-HFS-compatible text-file editor. $49.95. Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404. NCP (Sep 86)

inBox is an easy-to-use mail system. It's called up from a desk ♦♦♦♦½ accessory. Has a very slick interface. Dedicated Mac not required. $350 for starter set which includes one Administrator disk and three Connection disks. Additional Connections cost $125 each. Think Technologies, 135 South Rd., Bedford, MA 01730. NCP (May 87) ★'86 Eddy

InTalk comes with its own communications command language ♦♦♦♦½ able to do unattended sessions. Supports Xmodem and MacBinary. Has a macro key function. Many sample setup documents and command language files provided. $195. Palantir, 12777 Jones Rd., Houston, TX 77070. NCP (Prem)

LapLink Mac quickly transfers data to and from the MS-DOS and ♦♦♦♦ Mac environments. Kit contains a cable and software. Control of transfer is on the IBM side. Version: 1.2. Requires 512K. $139.95. Traveling Software, 19310 North Creek Pkwy., Bothell, WA 98011. NCP (Aug 88)

MacTerminal provides basic telecommunications and terminal emula- ♦♦½ tion. Doesn't have macros nor any sort of auto re-dial/auto log-on capability. Best for those needing faithful VT100 or IBM 3278 emulation — it is superb at those. $125. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP (Prem)

MacWorkStation is a development environment and communica- ♦♦♦♦ tions program that accesses custom mainframe applications through the Macintosh interface. Modular design allows for expandability. Mac II and MultiFinder friendly. Version 3.0. $2,500 for internal use license, $5,000 from commercial use license. Apple Software Licensing, 20525 Mariani Avenue, Cupertino, CA 95014. NCP (Oct 88)

MicroPhone is a high-powered terminal program that's easy ♦♦♦♦½ enough for novices. Very powerful command language allows full automation of communications, if desired. $149. Software Ventures, 2907 Claremont Ave., Berkeley, CA 94705. NCP (Jul 86) ★'86 Eddy

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MINIFINDERS



Microsoft Mail is an electronic mail system that runs under AppleTalk. Supports file transfers across the mail system. Full online help facility. Also includes "While you were out" messages. Desk accessory based. Prices determined by number of users licensed. One to four users, $299.95; five to 10 users, $499.95; 11 to 20 users, $749.95; 21 or more users, $949.95. Microsoft, 16011 NE 36th Way, Redmond, WA 98073-9717. NCP (May 87) ★'87 Eddy

Red Ryder is a full-featured telecommunications program that supports MacBinary, Xmodem, and Kermit. Has big screen support, auto procedure creator, and up to 30 keyboard macros. This is the cream of the crop (in late 87). $80. Freesoft, 150 Hickory Dr., Beaver Falls, PA 15010. NCP (Dec 87) ★'87 Eddy

Smartcom II balances power and ease of use. Capable of unattended operation and has a very powerful command language. Supports MacBinary, Xmodem, and Hayes Verification protocols. The large screen buffer can easily be archived. $149. Hayes, 5923 Peachtree Industrial Blvd., Norcross, GA 30092. NCP (Jul 86) ★'85 Eddy

Telescape is the power telecommunicator's terminal program. Can be configured to emulate any terminal. The documentation does not adequately explain the many features. $125. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP (Jun 86)

TOPS is a file server designed to network computers with different operating systems. Supports Macs, MS-DOS compatibles, and UNIX. Access to files and subdirectories is transparent to the user; they appear as Mac folders. Only handles ASCII or Text files. $149 for Mac version. $389 for PC's (comes with add-on card). TOPS, 2560 Ninth St., Berkeley, CA 94710. Serial number protected. (May 87) ★'87 Eddy

VersaTerm features include DEC VT100 and VT52, Tektronix 4014 graphics terminal and Data General DG200 emulation. Supports Xmodem and MacTerminal Xmodem protocols and MacBinary. VersaTerm is easy to use and well-documented. $99. Peripherals, Computers & Supplies, 2457 Perkiomen Ave., Mt. Penn, PA 19606. CP (Prem)

VersaTerm-Pro is a very powerful terminal program with several special features. Does one of the best VT100 emulations available and specializes in high-quality Tektronix 4014 and 4105 emulation. A pro's tool. Requires 512K+. $295. Peripherals, Computers & Supplies, 2457 Perkiomen Ave., Mt. Penn, PA 19606. NCP (Apr 87)

WORD PROCESSORS

Document Compare allows users to compare any two MacWrite 4.5, ASCII, or MDS documents. Differences in spelling, punctuation, formatting, and wording are detected. Documents can be printed out with differences highlighted. $99. Legalware, 33 Young St., Toronto, Ontario M5E 1S9, Canada. NCP (May 86)

Document Modeler can automate much of a professional office's correspondence. Comes in two parts: Template Maker and Document Maker. Initial setup requires time and is complex. $299.95. Legalware, 33 Young St., Toronto, Ontario M5E 1S9, Canada. NCP (Mar 87)

Doug Clapp's Word Tools is a useful punctuation and style editing program. It won't turn you into a Proust, but it will help you make your writing cleaner and clearer. Word counts among different formats show discrepancies, but not to worry. Requires 512K+. $79.95 Aegis Development, 2125 Pico Blvd., Santa Monica, CA 90405. NCP (Sep 87)

Expressionist is a powerful DA that allows you to create complex mathematical equations from within an application. Equation manipulation has never been easier. $79.95. Allan Bonadio Associates, 1579 Dolores St., San Francisco, CA 94110. NCP (Jul 87)

FullWrite Professional combines outlining and word processing with page layout and drawing. Its many features translate into sluggish performance unless you have a lot of extra RAM. Impressive. Version 1.0. Requires 1M. Mac II and MulitFinder friendly. $395. Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502. NCP (Sept 88)

Graham Speller is a desk accessory-based spelling checker. Includes macro feature. Good guesser in interactive mode. Clumsy interface. Version 1.1. $44.95. Graham Software, 8609 Ingalls Circle, Arvada, CO 80003. NCP (Aug 88)

Kadmos Greek Font is a full character set of ancient Greek that prints on any PostScript printer. Requires learning new typing skills, but excellent quality makes it worth the effort. $85. Allotype Typographics, 1600 Packard Rd., Ann Arbor, MI 48104. NCP (Oct 87)

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MINIFINDERS

Laser Author is a high-powered, technically oriented word processor. Good math setting capability. Has style sheets, word count, and page layout capability. $199.95. Firebird Licensees, PO Box 49, Ramsey, NJ 07446. NCP (Mar 87)

Lookup is an on-call, quick single-word spelling checker. Designed for the way writers really work. Uses the 93,000+ word Spellswell dictionary. $49.95. Working Software, 321 Alvarado, Suite H, Monterey, CA 93940. (Dec 87) NCP

MacGAS is a DA spelling checker with both a small and extended dictionary. Its best point is the excellent thesaurus, provides antonyms & glossary. A slow checker. $99. EnterSet, 2380 Ellsworth, Berkeley, CA 94720. CP (Oct 86)

MacProof is a grammar, style, and spelling checker that's like having your own personal copy editor. Grammar rules are fixed, and you may not agree with the choices. The program only suggests corrections, it doesn't make them for you. And the checking process can be slow if your document is long. $195 for standalone version; $2500 for networked version. Automated Language Processing Systems, 190 West 800 North, Provo, UT 84604. NCP (Apr 87)

Macspell+ v. 1.10 is a spelling checker that installs as a desk accessory. Works easily with MacWrite 4.5 and 2.2 and Word, but has some drawbacks. New version just available. Requires 512K+, two drives or hard disk. $99. Creighton Development, 16 Hughes St., Irvine, CA 92718. NCP

MacWrite is starting to show its age. While still a good, basic program, it's out-performed by its competition. Probably enough for the occasional user. Version 5.0 includes command key equivalents and spell checker. Requires 512KE+. $125. Claris, 440 Clyde Ave., Mountain View, CA 94043. NCP (Jun 88) ★'85 Eddy

MergeWrite is a mail-merge program for MacWrite (also works with ASCII files). Program combines names and addresses from a data file into predefined fields in a form letter. Also allows simple conditional IF-THEN-ELSE equations. $49.95. Software Discoveries, 137 Krawski Dr., South Windsor, CT 06074. NCP (Dec 87)

MindWrite integrates outlining and word processing better than anyone. Version 1.1 fixes many problems of the earlier version. Sophisticated search and select options. Unimpressive speed. $295. Access Technology, 555C Heritage Harbor, Monterey, CA 93940. NCP (Feb 88)

QUED/M v. 2.01 is an excellent text editor that saves documents in a form readable by most computers and printers. Doesn't support graphics or multiple fonts. Programming language allows creation of database. $129. Paragon Concepts, 4954 Sun Valley Rd., Del Mar, CA 92014. NCP (Mar 88)

QuickWord is a word processing accessory that adds sophisticated glossaries to MacWrite. Simple to install and use, yet powerful and efficient. $49.95. EnterSet, 2380 Ellsworth, Berkeley, CA 94720. NCP

Scriptor is designed for producing standard format scripts. Starts with a Word document. As you change your Word document, Scriptor will reformat, renumber, and reprint the script. Supports LaserWriter and daisywheel printers. $295. Screenplay Systems, 348 E. Olive Ave., Suite F, Burbank, CA 91502. NCP (May 87)



MINIFINDERS



Spelling Champion is a fast and accurate batch-type spelling checker. Back-up feature allows you to undo corrections in a paragraph. Works only with MacWrite 4.5. $39.95. Champion Software, 6617 Gettysburg Dr., Madison, WI 53705. NCP (Oct 86)

Spelling Coach Professional is a desk accessory and stand-alone spelling checker as well as thesaurus. Includes dictionary definitions. Off-the-wall phonetic guesses. Version 3.0. $195. Deneba Software, 7855 N.W. 12th Street, Suite 202, Miami, FL, 33126. NCP (Aug 88)

Spellswell is a stand-alone batch spelling checker. Also checks for punctuation and other errors. Good dictionary, thorough checking, simple interface. Weak guessing. Version 2.0. $74.95. Working Software, 321 Alvarado St., Monterey, CA 93940. NCP (Aug 88)

Thunder! is a desk accessory spelling checker. Includes macro features. Fairly fast, good guessing of misspelled words. Small dictionary. MultiFinder hostile. Version 1.1. $49.95. Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404. NCP (Aug 88)

Word Finder is an electronic thesaurus that won't replace your trusty Roget's, but is still useful for checking synonyms on the fly. Large respectively. Version 2.0. Requires 512K. Mac II and MultiFinder friendly. $59.95. Microlytics, 300 Main St., Rochester, NY 14445. NCP (Sept 88)

Word 3.01 fixes many of the bugs of the justly maligned 3.0. Still, it's the most feature-laden word processor around. Also has Microsoft's somewhat unusual view of what the Mac interface is. Esoteric command key combinations. Requires 512K+. $395. Microsoft, 16011 NE 36th Way, Redmond, WA 98073. NCP (Mar 88)

WorksPlus Spell is a speedy spelling and hyphenation checker for Microsoft Works. It includes a glossary for abbreviations and time/date stamping. The biggest drawback is its limitation to one program. $59.95. Lundeen & Associates. PO Box 30038, Oakland, CA 94604. NCP (Oct 87) ★'87 Eddy

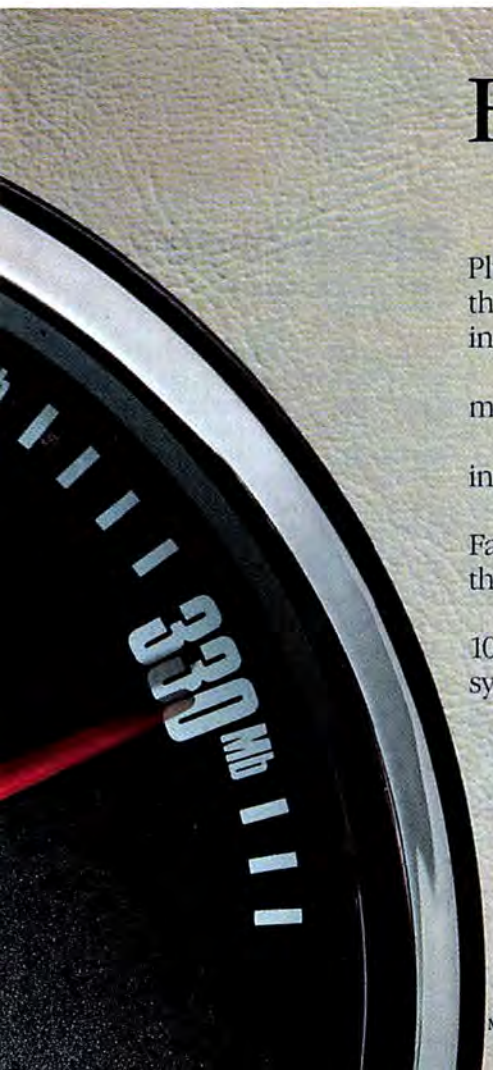
Write is a "beginner's" version of Word 3.0. More features than some word processors in its class, but not all of the features work well. Poor value, and expensive upgrade path to Word. $175. Requires 512K+. Microsoft, 16011 NE 36th Way, Box 97017, Redmond, WA 98073-9717. NCP (May 88)

WriteNow for the Macintosh has many of the features of MacWrite and then some, including the ability to work in columns. Has built-in spelling checker with 50,000-word dictionary. $175. T/Maker, 1973 Landings Dr., Mountain View, CA 94043. NCP (Mar 87)

SYSTEM SOFTWARE

HyperCard is a totally unique program for the Mac. It uses an index card metaphor and it contains a programming language, HyperTalk. Requires 1M+. Free with new Macs, otherwise $49.95. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP (Dec 87) ★'87 Eddy

System Software Update 6.0 contains an improved version of MultiFinder and new features like CloseView (for visually impaired users), Map, and MacroMaker. Incompatible with many programs; lots of small bugs. Requires 1megabyte.



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$49. Apple Computer, 20525 Mariani Avenue, Cupertino, CA 95014. NCP (Oct 88)

System Tools 5.0 is the Apple System upgrade for Mac Plus, SE, ★★★★ and II owners. It contains MultiFinder (a multitasking environment), a LaserWriter spooler, and a Control Panel resource to add color on the Mac II desktop. Takes 1M+. $49. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP (Mar 88)

HYPERCARD

Business Class is a HyperCard stack that contains world travel ★★★½ information and itinerary planning. Uses maps to locate countries of interest, but it lacks United States domestic travel information. Requires 1M+ and HyperCard. $49.95. Activision, 3885 Bohannon Drive, Menlo Park, CA 94025. NCP (Mar 88)

City to City imparts travel information on 31 U.S. cities including ★★★★ details on hotels, restaurants, and nightlife. Helps plan an itinerary. Requires HyperCard, 2 disk drives, and a printer. $49.95. Activision, 3885 Bohannon Dr., Menlo Park, CA 94025. NCP (Sep 88)

Focal Point is a HyperCard stack that ties together a calendar, ★★★★½ phone log, client accounts, and more in one easy-to-use organizational tool. Requires 1M+ and HyperCard. $99.95. Activision, 3885 Bohannon Drive, Menlo Park, CA 94025. NCP (Mar 88)

HyperBook Maker adds many of the printing utilities that Hyper- ★★★ Card lacks. Best used to figure out signature breaks to print pamphlets. Version 1.1a reviewed. Mac II and MultiFinder friendly. $59.95. Ideaform, 612 West Kirkwood, Fairfield, IA 52556. NCP (Jun 88)

HyperAtlas is a collection of U.S. and World maps that are ★★★ networked to stacks containing economic, political, and population data. Version 1.0. Requires HyperCard and second disk drive or hard disk. $99. MicroMaps Software, P.O. Box 757, Lambertville, NJ 08530. NCP (Oct 88)

HyperDA lets you browse through HyperCard stacks through a desk ★★★★ accessory. A true equalizer for 512K Mac owners who cannot normally access stackware. Doesn't support global variables. Requires 512K+. $69. Symmetry, 761 E. University Dr., Mesa, AZ 85203. NCP (May 88)

HyperTutor is a stack that teaches HyperTalk, Hypercard's pro- ★★★★½ gramming language. Uses an interactive Test Mac on each card to write scripts. A variety of windows makes it good for both beginners and advanced programmers. $49.95. Teligraphics, 936 Sir Francis Drake Blvd., Kentfield, CA 94904. NCP (Apr 88)

Reports endows HyperCard stacks with the power to sort and im- ★★★½ part information like a database. Customizing reports is difficult. Requires HyperCard. $99.95. Activision, Inc., 3885 Bohannon Dr., Menlo Park, CA 94025. NCP (Aug 88)

ScriptExpert helps you generate HyperTalk scripts by leading you ★★★★ through the correct use of the language. Select a common command, and dialog boxes prompt you for necessary components. Version 1.0 Requires HyperCard. $79.95. Hyperpress Publishing, P.O. Box 8243, Foster City, CA 94404. NCP (Oct 88)

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Acta is an outline processor in desk accessory format. It has practi- ★★★★½ cally all the power of a stand-alone program, and then some. Can save files as Acta outlines, MacWrite files, or text files. Version 2.0. $79. Symmetry Corporation, 761 East University Drive, Mesa, AZ 85203. NCP (Oct 88)

AEC Information Manager helps middle-level managers keep track of ★★½ projects from start to finish. Has date calculations, scheduling graphs, and alarms. Overpriced. Version 1.21 reviewed. Requires 1M+. $695. AEC Management Systems, 20524 Amethyst Lane, Germantown, MD 20874. NCP (Jul 88)

Calliope is a new type of outlining program. Chunks of information ★★★ are manipulated as small "light bulbs" containing text. Related elements can be graphically connected, and their text information viewed in hierarchical order. Text files can be created for MacWrite editing. $99. Innovision, PO Box 1317, Los Altos, CA 94023. NCP (Sep 86)

Comment (previously known as Memorandum) is the electronic ★★★½ equivalent of Post-it Notes. Notes can be attached to many different types of documents. Doesn't work well with SuperPaint or Microsoft Works. An alarm clock feature alerts users of Timed Notes. $99.95. Deneba Systems, 7855 NW 12th Street, Suite 202, Miami, FL 33126. NCP (Nov 87)

DecisionMap organizes data to facilitate decision making. Unique ★★★ weighting abilities make this a powerful tool. The decision analysis process is long and sometimes complex, but never difficult. $145. SoftStyle, 7192 Kalanianole Hwy., Honolulu, HI 96825. CP

Design is a powerful organizational tool. It goes beyond mere flow- ★★★★½ charting. Graphically depicts relationships between systems. Complex, detailed program aimed at software pros. $250. Meta Software, 150 CambridgePark Dr., Cambridge, MA 02140. NCP (Apr 88)

FamilyCare is a "yuppie" handbook to childhood diseases. The ★★★ rule-based expert system gives advice based on symptoms. Ailments and diseases run the gamut from acne and appendicits to wheezing and yeast infections. Lacks graphics. Version 1.0. Requires 512K. $99. Lundin Laboratories, 29451 Greenfield Rd., Southfield, MI 48076. Mac II and MultiFinder friendly. NCP (Sept 88)

Family Heritage File a genealogy database that is compatible with ★★★ programs issued by the Mormon Church. An MS-DOS spinoff that doesn't support the Mac interface well. Requires 512K. $149. StarCom Software Systems, Windsor Park East, 25 West 1480 North, Orem, Utah 84057. NCP (Oct 88)

Family Roots is a genealogy program that allows you to customize ★★★ input with programmable function keys. Unfortunately, its user interface is poor. Buggy and slow. Version 1.3. Requires 512K. $72.50. Quinsept, P.O. Box 216, Lexington, MA 02173. NCP (Oct 88)

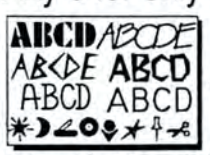
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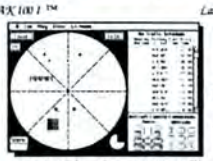


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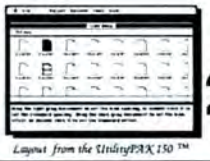


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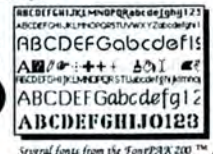
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GeoQuery puts your database on the map by accessing Zip code information. Comes with maps of the U.S. Other atlases available. Version 1.0 reviewed. Requires 1M+ and second disk drive. $349. Odesta, 4084 Commercial Avenue, Northbrook, IL 60062. NCP (Jul 88)

Guide allows you to "cross reference" from within a document using hypertext. You can set up words or sections of the document so that double-clicking brings up explanatory material, graphics, and other useful items. The word processing and formatting functions, however, are limited. $135. OWL International, 14218 NE 21st St., Bellevue, WA 98007. NCP (Apr 87)

Instant Expert is an excellent way to learn the mechanics of creating an expert system. The inference engine (that ultimately finds the answer) is visible. Lacks a true Mac interface. Version 1.0. $49.95. Human Intellect Systems, 1670 S. Amphlett Blvd., Suite 326, San Mateo, CA 94402. NCP (Jan 88)

MacGene tracks your family tree elegantly and with graphics. Documentation is scanty, and it doesn't handle dates too well. Version 2.85. Requires 512K. $145. Applied Ideas, P.O. Box 3225, Manhattan Beach, CA 90266. NCP (Oct 88)

MacProject allows a user to plan and track a project from beginning to end. Uses CPM to produce schedules with start and finish dates for each task. Can report on resource interdependencies and generate all needed printed reports. $195. Claris, 440 Clyde Ave., Mountain View, CA 94043. NCP (Mar 86)

MacSMARTS can create small, standalone expert systems. Features hypertext connections to Paint, PICT, SYLK, and text files. Still a little buggy. Requires 512K+. Version 1.03. $149.95. Cognition Technology, 55 Wheeler St., Cambridge, MA 02138. NCP (Jan 88)

Micro Planner Plus is a great project management system. Outstanding analysis capability. Memory based, making it much faster than the original. Includes a font menu. Even saves reports out in MacDraw format for further work. Uses standard print drivers. HFS compatible. $495. Micro Planning International, 235 Montgomery St., San Francisco, CA 94104. NCP (Dec 86)

MORE is an incredibly powerful outline processor with gobs of great features: instant charts, math capabilities, multiple windows, font and style control, templates, and more. Prints outlines in any of several standard formats, even in color. Requires 512K+. $395. Symantec, 117 Easy St., Mountain View, CA 94043. NCP (Jan 87) ★'86 Eddy

PowerPoint is a comprehensive presentation-creation tool. Handles 35mm slide and overhead transparency formats. Good graphics and text editing capabilities. Requires 512K+. $395. Microsoft, 16011 NE 36th Way, Redmond, WA 98073-9717. NCP (Aug 87) ★'87 Eddy

STELLA for Business is a simulation tool used to model complex business systems. Requires that you master a discipline called "system dynamics." Requires 512K+. Mac II version available. $350. High Performance Systems, 13 Dartmouth College Hwy., Lyme, NH 03768. NCP (Jun 88)

SuperExpert is an expert system shell that induces rules from examples. Rules become unwieldy when many criteria and examples are used. Overpriced. Version 1.4 reviewed. Requires 512KE. $199.95. Softsync, 162 Madision Avenue, New York, NY 10016. NCP (Jul 88)

DESK MANAGERS

Executive Office is a jack of all trades office application. Good database, word processing, graphics, and minispreadsheet. Available on 400 or 800K disks; get the 800 if you can. $249.99. DataPak, 14011 Ventura Blvd., Sherman Oaks, CA 91423. CP (Mar 87)

Front Desk lets small businesses and offices easily keep track of personnel schedules, activities, and payments. The program can keep track of up to 15 employees, functioning as a day-, week-, and month-at-a-glance calendar. $149.95. Layered, 529 Main St., Boston, MA 02129. NCP (Dec 85)

MockPackage+ is a set of extremely powerful DAs. Includes a text editor, text printer (supports LaserWriter), charter, terminal, and EZmenus. HFS compatible. $35. CE Software, 1854 Fuller Road, West Des Moines, IA 50265. NCP (Mar 87)

My Office lets you handle your files and papers in much the same way you did before you got a computer. Excellent use of graphic symbols. $129.95. DataPak, 14011 Ventura Blvd., Sherman Oaks, CA 91423. CP (Prem)

Quickset is a set of desk management and organizational tools that can be used as desk accessories or applications. Functions include note filer, card filer, calendar, phone dialer, financial, and statistical calculators, and a file encryptor. $49.95. EnterSet, 2380 Ellsworth, Berkeley, CA 94720. NCP (Dec 85)

SideKick 2.0 beefs up original SideKick DAs and adds two major new ones — MacPlan, (formerly Click-On Worksheet) and Outlook, a full-featured outliner. Also comes with seven applications to support the desk accessories. $99.95. Borland International, 4585 Scotts Valley Dr., Scotts Valley, CA 95066. NCP (Jun 87)

Smart Alarms is the best reminder system for the Mac. Easy to use, versatile and, well, smart. This self-running DA automatically reminds you of anything you enter into its Reminder file, giving you a wide range of useful advance warning options. $49.95. Imagine Software, 19 Bolinas Rd., Fairfax, CA 94930. NCP (Oct 86)

Top Desk is a set of 7 self-installing (and self-removing) DAs. Menu Key adds Command key sequences to programs; View allows looking at and moving data between up to 8 MacWrite documents; also included are BackPrint, Touch 'n' Go, Blank, Encrypt, and Launch. $59.95. Cortland Computer, PO Box 9916, Berkeley, CA 94709. NCP (May 86) ★'86 Eddy

UTILITIES

AutoSave DA is insurance against system crashes. It saves your work automatically at intervals from 1 to 99 minutes. Compatible with many applications, but not recommended for use with databases. $49.95. Magic Software, 1706 Galvin Rd. S., Bellevue, NE 68005. NCP (Jan 88)

Capture saves any portion of a Macintosh screen to the Clipboard or as a PICT file. Works in color on the Mac II. Requires 512K+. MultiFinder friendly. $59.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP (Jun 88)

Colorizer adds pigments to the desktop and black and white applications. Also colors PICT graphics. System resources include saving and printing color screens. A useful novelty that'll run its course as developers add color to apps. Requires Mac II. $49.95. Palomar Software, PO Box 2635, Vista, CA 92083. NCP (Jan 88)

Copy II Mac does efficient sector and bit copies and in its latest version can back up virtually all Mac software. Features graphic displays of copy progress. Comes with MacTools, a multi-use utility that can recover many damaged files. $39.95. Central Point Software, 9700 SW Capitol Highway, Portland, OR 97219. NCP (Apr 86) ★'85 Eddy

DiskExpress unfragments disk volumes by reorganizing data into continuous sectors and arranging files to slow down further fragmentation. Works with MacServe, floppy drives, and most hard drives. Requires 512K+. $39.95. ALSoft, Box 927, Spring, TX 77383. NCP (Feb 87)

DiskFit is a utility for backing up and restoring hard disk files. Creates a "SmartSet" of floppy disks so incremental back-ups

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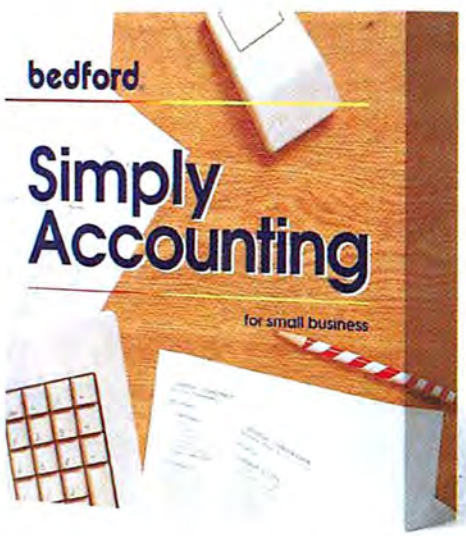
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MINIFINDERS



only update files modified since the last back-up procedure. Backs up to floppies or another hard disk. Requires 512K+. $74.95. SuperMac Software, 295 N. Bernardo Ave., Mountain View, CA 94043. NCP (Jun 87)

DiskQuick is an easy-to-use cataloging program. Criteria selection option for generating subcatalogs. Requires 512K+. $49.95. Ideaforms, PO Box 1540, Fairfield, IA 52556. NCP (Apr 87)

Disk Ranger is a speedy cataloging program that doubles as an efficient labelmaker. Comes with pinfeed labels. Works with regular and hard disks. Can catalog HFS systems. $34.95. Graham Software, 8609 Ingalls Circle, Arvada, CO 80003. NCP (Mar 86)

DiskTools Plus is a set of 8 useful DAs and applications. Earlier version was sold as Battery Pak. The DA Disk Tools II is a Finder replacement. Also included are an RPN calculator, Phone Pad, and Calendar Manager. Requires 512K+. $49.95. Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404. NCP (Mar 88)

DiskTop is a desk accessory Finder replacement of extraordinary power and ease of use. Comes with the useful LaserStatus DA and Widgets application. The extras alone are worth the price. Requires 512K+. Upgrade from version 1.0, $7; $10 with new manual. $49.95. CE Software, 1854 Fuller Road, West Des Moines, IA 50265. NCP (Aug 87)

Dubl-Click Calculator Construction Set lets users design personalized calculators with a variety of standard and special functions. Finished calculators can be saved as installable desk accessories or as clickable applications. $59. Dubl-Click Software, 18201 Gresham St., Northridge, CA 91325. NCP (Apr 86)

Eureka: The Solver is a free-form numerical equation solver. Standard trigonometric and logarithmic functions are available as is treatment of imaginary and complex numbers. $195. Borland International, 4585 Scotts Valley Dr., Scotts Valley, CA 95066. NCP (Mar 88)

Fastback for the Macintosh is hard disk back-up software that is very quick if not very efficient. Doesn't automatically exclude applications. Creates a separate catalog disk. $99.95. Fifth Generation Systems, 1322 Bell Ave., Tustin, CA 92680. NCP (Apr 88)

FedIt Plus is the file and disk editor for everyone, from newest Mac owner to oldest. It can do more for your disks and files than any other application. Can recover deleted MFS files. If you own a Mac, get it. HFS-compatible. $49.95. MacMaster Systems, 108 E. Fremont Ave., #37, Sunnyvale, CA 94087. NCP (Sep 86) ★'86 Eddy

Findswell is an indispensible utility that installs a new button in the Open Dialog box of virtually every Macintosh application. Press the button, type a search string, press Find and Findswell searches for any files that match. Click Open or double-click to open the correct file. Requires 512K+. $49.95. Working Software, 321 Alvarado, Monterey, CA 93940. NCP (Nov 87) ★'87 Eddy

1stAid Kit HFS recovers lost or damaged files from floppy or hard disks. An excellent manual-turned-textbook actually teaches the Hierarchical File System. Requires 1M+. Version 2.2 reviewed. $99.95. 1st Aid Software, 42 Radnor Rd., Boston, MA 02135. NCP (Jun 88)

FlashBack is a utility to back up HFS hard disks onto floppies. A unique graphic display of the HFS directory facilitates file selection. The program can handle files larger than 800K. $59.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP (Nov 86)

Font/DA Juggler Plus gives you unlimited access to almost any number of fonts, desk accessories, and sounds. Uses hierarchical menus. $59.95. Alsoft, PO Box 927, Spring, TX 77383. NCP (May 88)

Glue adds a print-to-disk capability to many programs. ImageSaver installs as printer driver; Viewer allows copying and printing of Glue files. Handy utility for desktop publishers. $59.95. Solutions International, Box 989, Montpelier, VT 05602. NCP (Dec 86)

Hard Disk Util uses patch files to allow users to mount and run specified programs on their hard disks. The list of patches is constantly expanding. $89.95. FWB Software, 2040 Polk St., San Francisco, CA 94109. NCP

HFS Backup ranks as one of the preferred hard disk back-up utilities. Back up by file/folder or last changes. Back-up specifications can be saved as templates. Good graphic interface. Reliable program. $49.95. PCPC, 4710 Eisenhower Blvd., Tampa, FL 33634. NCP (Dec 86)

HFS Locator Plus is *the* essential HFS desk accessory. It can search for a file by name or date of creation, create folders, move files from one folder to another, set a program to launch while in an application. $39.95. PBI Software, 1163 Triton Dr., Foster City, CA 94404. NCP (Sep 86)

Icon-It! v. 1.0 lets you create icons to use as an alternative to menu commands. Comes with 47 icon templates or you can create your own. $79.95. Olduvai Software, 7520 Red Rd., South Miami, FL 33143. NCP (Feb 88)

LabView is a graphical programming environment that creates "virtual instruments" to perform calculations, acquire laboratory data, and control instrumentation. Slow. Version 1.1 reviewed. $1900. National Instruments, 12109 Technology Boulevard, Austin, TX 78727-6204. NCP (Jul 88)

LaserServe is a printer spooler for AppleTalk networks. After installation all operations done via a desk accessory. Works with both MacServe and TOPS. Requires 512K+ and 800K drive or hard disk. $95 per node. Infosphere, 4730 SW Macadam Ave., Portland, OR 97201. NCP (Feb 87)

Mac Disk Catalog II is a utility that will quickly organize a moderate size disk library. Easy to use with powerful reporting and label-making features. $49.95. New Canaan MicroCode, 136 Beech Rd., New Canaan, CT 06840. NCP (Dec 85)

MacEZ-Mill is a CAM program that controls industrial milling machines. Quickly writes part programs that previously only very experienced designers could execute. $6000. Bridgeport Machines, 500 Lindley Street, Bridgeport, CT 06606. CP (Jul 88)

MacFlow is a design tool created for programmers. Traditional flowcharting symbols are linked together, and a symbol can be connected to a separate flowchart file. Now supports custom symbols. $125. Mainstay, 5211-B Derry Ave., Agoura Hills, CA 91301. NCP (Apr 87)

MacInUse tracks time spent in applications and saves info as text files. Installs on any disk, works in background. MFS, HFS compatible. Extremely valuable for tax purposes, client records, etc. $79. SoftView, 4820 Adohr Lane, Camarillo, CA 93010. NCP (Jan 87) ★'86 Eddy

MacLabeler lets users instantly index and print labels for all the disks in a burgeoning collection. Choose border type and orientation of your label; index by folder or document. Starter set of labels is included. $49.95. Ideaform, PO Box 1540, Fairfield, IA 52556. NCP (Prem)

MacNosy is a global disassembler. A very advanced user can use this program to look into the code of virtually any program. This advanced tool can take you places no other Mac program could dream of going IF you have the skill to guide it. The documentation is sparse. For pros only. $90. Jasik Designs, 343 Trenton Way, Menlo Park, CA 94025. NCP

MacSafe is a data file security program that allows you to place multiple files into a "safe," and then you can further protect them through two types of encryption (including DES). Flexible and very easy to use. Allows for installation on hard disk. $149.95. Kent Marsh Ltd, 1200 Post Oak Blvd., Houston, TX 77056. CP (Mar 87)

MINIFINDERS



MacServe converts a Mac and a hard disk into a disk and print ★★★★½ server. Uses the AppleTalk network and is easily hooked up. Users can partition the hard disk into multiple volumes. Runs in the background, so users can work on all machines in the network. $250. Requires 512+. Infosphere, 4730 SW Macadam, Portland, OR 97201. CP

MacTree displays your files in the form of a hierarchical tree. Good ★★★½ idea, poor performance. Can't view tree easily. Good search function. Requires 512K+. $69.95. Software Research Technology, 22901 Mill Creek Dr., Laguna Hills, CA 92653. NCP (Apr 88)

MacZap is a three-part disk and memory utility. It can be used to ★★★★ recover some damaged files and disks, compare disks, analyze disk structure, and make back-up copies of most disks. $60. Micro Analyst, 2505 Roxmoor, Austin, TX 78723. NCP (Jan 86)

Menu Fonts displays the names of fonts in the actual font instead of ★★★ standard Chicago. Won't work with programs that have a nonstandard Font menu or no Font menu. Comes with Lock-Out, a utility that gives password access to your Mac, and FastFormatter, a utility for formatting multiple blank disks. Requires 512K+. $15. Beyond Software, 6069 E. Grant Rd., Tucson, AZ 85712. NCP (Jul 87)

myDiskLabeler is an excellent label maker. It can read directories ★★★★ and use large or small icons or anything desired. Comes with 54 precut labels. $44.95; with color printing ability (on the ImageWriter II), $54.95; with PostScript font capability (on the LaserWriter), $64.95. Williams and Macias, PO Box 19206, Spokane, WA 99219. NCP (Aug 87)

'Ncryptor is a simple safe program that lets users password their ★★★★ files. The same program is used for encoding and decoding. This is one of the best products in its category. $39.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP

NightWatch locks up your hard disk by using a floppy start-up disk ★★★★½ that acts as key. Type in the correct password, and access to the hard disk is allowed. Version 1.02. Requires 512KE, a hard disk, and an 800K Drive. Mac II and MultiFinder friendly. $149.95. Kent Marsh Ltd., P.O. Box 460289, 1200 Post Oak Blvd., Suite 210, Houston, TX 77056. NCP (Sept 88)

On Cue lets you switch applications without returning to the Finder. ★★★★½ Under MultiFinder, active applications are listed on a pop-up menu. Can also launch directly to a specific document. Version 1.0. Requires 512K. Mac II and MultiFinder friendly. $59.95. Icom Simulations, 648 South Wheeling Rd., Wheeling, IL 60090. NCP (Sept 88)

PackIt III is an essential utility. Primarily used to temporarily "glue" ★★★★½ files together, it can also compress and encrypt. Feeware. $10, $10 for printed manual. Harry R. Chesley, 1850 Union St., San Francisco, CA 94123. NCP (Jan 87)

PowerStation is an extremely easy-to-use, versatile and powerful ★★★★★ Finder substitute. Loaded with power user features. Comes with Pyro! $59.95. Fifth Generation, 1322 Bell Avenue, Tustin, CA 92680. NCP (Dec 87)

Printworks for the Mac is a comprehensive software-based dot-★★★½ matrix printer control system. Optimizes printing from different applications, and easy to use. Requires 512K+. $75. SoftStyle, 7192 Kalanianaole Hwy., Honolulu, HI 96825. NCP (Aug 87)

Programmer's On-line Companion puts an abridged version of ★★★ Inside Macintosh in your system for reference. Simply read the text or transfer some or all of it directly into your normal editing window. Non-Mac-ish interface makes the program confusing, somewhat difficult to use. $34.95. Addison-Wesley, Route 128, Reading, MA 01867. NCP (Jul 87)

Quick & Dirty Utilities, Volume One is a disk full of handy programs. ★★★★½ Several desk accessories include a menu bar clock and a terminal emulator. $39.95. Dreams of the Phoenix, PO Box 10273, Jacksonville, FL 32247. NCP (Nov 85) ★'85 Eddy

QuicKeys lets you make full use of your keyboard. Assign any ★★★★★ command (menu choices, DAs, etc.) or series of text blocks and/or command to any key or key combination. Enormously powerful; necessary for Apple Extended Keyboard owners. Requires 512K+. $99.95. CE Software, 1854 Fuller Road, West Des Moines, IA 50265. NCP (Jan 88) ★'87 Eddy

RamSnap is a RAMdisk and disk cache in one easy-to-use pack-★★★★ age. Can store multiple configurations as files. Good product but a little pricey. $59.95. Dove Computer Corp., 1200 North 23rd St., Wilmington, NC 28405. NCP (Jun 87)

Read-it! v. 1.0 is the best consumer value in optical character ★★★★ recognition software. Works with any scanner that saves images as a bit map, PICT or TIFF file. Comes with type tables that can be customized. Version 1.1, $395; ThunderScan version, $149.95. Olduvai Software, 7520 Red Rd., South Miami, FL 33143. NCP (Apr 88)

Sentinel encrypts data files (or sets of files) using a super-secure ★★★★ DES or a super-fast SuperCrypt algorithm. Provides high-level security if you can keep your passwords secret. Requires 1M+. $149.95. SuperMac, 295 N. Bernardo Ave., Mountain View, CA 94043. NCP (Apr 88)

SmartScrap and The Clipper are two useful desk accessory utili-★★★★½ ties for graphics work. SmartScrap is a major enhancement to the standard Scrapbook DA. The Clipper provides you with a transparent Clipboard window, allowing you to resize or crop a graphic to the area that it will be pasted to. $59.95. Solutions International, PO Box 989, Montpelier, VT 05602. NCP (Jul 87) ★'87 Eddy

SoundWave is a useful sound recording and editing utility. Works ★★★★ with waveforms; able to change sampling rates. Previously known as SoundCap. $199.95. Impulse, 6870 Shingle Creek Parkway, Minneapolis, MN 55430. NCP (Apr 88)

Stepping Out II is a software alternative to a large-screen monitor. ★★★★★ Lets you create a virtual screen (as large as memory allows) inside the Mac's 9-inch screen. Automatically scrolls to new document position as you type or draw. Version 2.0. Requires 1 megabyte. $95. Berkeley System Design, 1700 Shattuck Avenue, Berkeley, CA 94709. NCP (Oct 88)

Suitcase is a transparent program that automatically lets you use ★★★★★ all your fonts and DAs. Foolproof and indispensible. Comes with Pyro!, the best screen saver. Requires 512K+. $59.95. Fifth Generation, 1322 Bell Avenue, Tustin, CA 92680. NCP (Nov 87) ★'87 Eddy

SuperLaserSpool is a LaserWriter spooler. Very fast because it ★★★★ does conversion to PostScript in the background, but doesn't print a faithful rendition of PageMaker documents as a result. $149.95 single user, $395.95 for up to five users on one network. SuperMac Software, 950 N. Rengstorff Ave., Mountain View, CA 94043. NCP (Jun 87)

Switcher is Andy Hertzfeld's contribution to Mac productivity. This ★★★★★ program lets users run several programs at once (up to eight on a 1-megabyte or larger machine). Switching between the programs is nearly instantaneous. Requires 512K+. $19.95 from Apple, free from BBSs, included with some third-party applications. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP (Jun 86)

Symantec Utilities for Macintosh (or SUM) reduces worries about ★★★★★ losing data. It prevents, diagnoses, and if required, fixes many serious disk and file problems. Recovers lost files on crashed hard disks. Version 1.0. Requires 512KE. $99.95. Symantec, 10201 Torre Ave., Cupertino, CA 95014. NCP (Sept 88)

Tempo is a desk accessory that allows most Mac commands to be ★★★★ intelligently recorded and played back. Capabilities include pausing, conditional branching, and macros that work between applications. $99. Affinity Micro Systems, 1050 Walnut St., Boulder, CO 80302. NCP (Jul 86)

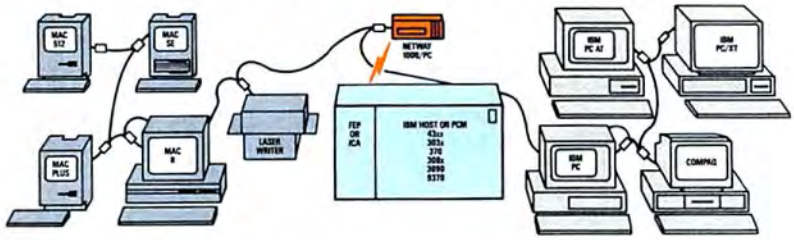
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MINIFINDERS



TMON is the debugger for the Mac. This isn't open to question. ★★★★★ TMON is simply the best. Comes with the latest version of Darin Adler's Extended User Area. $149. ICOM Simulations, 626 Wheeling Rd., Wheeling, IL 60090. NCP

Turbo Download is a desk accessory designed specifically to in- ★★★★½ crease the speed of Xmodem data transfers from national databases to your Mac. Speed increases range upward from 50% to over 300% at 2400 baud. $39.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP

Twelve-C Financial Desk Accessory brings all the power and func- ★★★★ tionality of a Hewlett-Packard 12C programmable calculator to your desktop. Can be programmed and all registers can be viewed while calculator is running. $49.95. Positive Works, 142 Cone Road, Ormond Beach, FL 32074. NCP

TypeNow is a desk accessory that allows the Mac and ImageWriter ★★★★ to function as an electronic typewriter. Type can be placed into blanks in complex forms easily. Typing can be recorded and played back. $39.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP (Jan 86)

WorksPlus Command lets you build and define macros for all ★★★★ Works modules. Predefined macros provide for an even tighter integration of program's word-processing, spreadsheet, and database modules. Requires 1M+. $99.95. Lundeen & Associates, PO Box 30038, Oakland, CA 940604. NCP (May 88)

LANGUAGES

AAIS Prolog is a fast standard Prolog with excellent debugging and ★★★★ error handling. Good for serious program development. Documentation is not as good as the program. $150. Advanced AI Systems, PO Box 39-0360, Mountain View, CA 94039-0360. NCP (Mar 87)

Aztec C is a C language that will appeal to users with a UNIX ★★★★ background. It uses many UNIX conventions and in the more expensive versions comes with standard UNIX utilities, including the VI editor. $75 beginners, $199 basic system, $299 development system, $499 commercial system. Manx Software Systems, PO Box 55, Shrewsbury, NJ 07701. NCP (May 86)

Basic Compiler is the long-awaited compiler for Microsoft BASIC. ★★★½ The interface is unfriendly, but it gets the job done. Compiled programs run faster, but you can still tell they are written in BASIC. $195. Microsoft, 16011 NE 36th Way, Redmond, WA 98073-9717. NCP (May 87)

ExperCommon Lisp is a LISP development system. Not fully Common ★★★ LISP compatible, but creates good compiled code and standalone applications. Requires 1M+. $995. ExperTelligence, 559 San Ysidro Rd., Santa Barbara, CA 93108. NCP (Aug 87)

ExperLISP is a useful programming language for high-level pro- ★★★ grammers. The more you use it, the more you'll figure out about it. $495. Requires 512K+. ExperTelligence, 559 San Ysidro Rd., Santa Barbara, CA 93108. CP

ExperLogo is a version of the popular teaching language, Logo. ★★★ Features three-dimensional graphics using "bunnies" rather than the usual "turtles." Very speedy, smooth program. Comes with an excellent manual. $149.95. ExperTelligence, 559 San Ysidro Rd., Santa Barbara, CA 93108. CP

ExperProlog II is a Prolog based on the new Prolog II standard. Has ★★★ the ability to handle infinite trees and allows user-defined functions that operate conditionally. Documentation is not the best and Mac interface is nonstandard. $495. ExperTelligence, 559 San Ysidro Blvd., Santa Barbara, CA 93108. NCP (Mar 87)

Lightspeed C provides an integrated environment for developing ★★★★½ desk accessories, applications, and code resources in C. The editor works with the compiler for searches and file management. Can get awkward if you need something outside the environment. $175. Think Technologies, 135 South Rd., Bedford, MA 01730. NCP (Apr 87)

Lightspeed Pascal is a fast, powerful development system for ★★★★★ Pascal programming. Fully integrated Mac-like environment. Requires 512K+. $125. Think Technologies, 135 South Rd., Bedford, MA 01730. NCP (Feb 87)

LPA MacProlog v. 2.0 is a much improved program that includes ★★★★ incremental and optimizing compilers, a graphics environment package, and C and Pascal submodules. Requires 1M+. $495. Programming Logic Systems, 31 Crescent Dr., Milford, CT 06460. NCP (Feb 88)

MacAsm is a software development system that allows programs to be ★★★ written in assembly language. Programmers can assemble, edit, and test software, and an integrated resource compiler lets independent applications run from their own icons. $125. Mainstay, 5311-B Derry Rd., Agoura Hills, CA 91301. NCP

Mac C is a good, highly Mac-oriented implementation of this popu- ★★★★ lar development language. Assembler and linker included. $425. Consulair, 140 Campo Dr., Portola Valley, CA 94025. NCP ★'85 Eddy

MacExpress is a development environment or shell. Programmers ★★★ use it to save time and effort when developing standalone applications for the Mac. $195. ALSoft, PO Box 927, Spring, TX 77383. NCP (Feb 86)

MacForth Plus is an excellent implementation of the popular Forth ★★★★ programming language. New, reduced price, $199. Creative Solutions, 4701 Randolph Rd., Rockville, MD 20852. NCP

Mach II is a multitasking implementation of Forth that allows local ★★★★ variables and text files. Can create standalone applications. Several windows can be up with different operations in each, operating concurrently. Execution is fast. $99.95. Requires 512K+. Palo Alto Shipping, PO Box 7430, Menlo Park, CA 94026. NCP (Apr 86)

Macintosh 68000 Development System is a fairly traditional as- ★★★★ sembly language package. The two-disk set provides an editor (Edit), an assembler, a linker, an executive, and a resource compiler. $195. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP

Macintosh Pascal is Apple Computer's version of this very popular ★★★ programming language. Loaded as it is with innovative teaching features, this interpreter is an excellent introduction to Pascal. $125. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. CP

MacScheme is a LISP dialect with "artificial intelligence" capabili- ★★★ ties. Has a large appetite for RAM. Interpreted language with Toolbox access limited to a small part of QuickDraw. $125. Semantic Microsystems, 4470 S.W. Hall St., Beaverton, OR 97005. NCP (Jun 86)

MacScheme+Toolsmith is a Mac version of Scheme, a LISP dia- ★★★★★ lect. Beautiful implementation, marred only by relative slowness compared to similar products. Get Toolsmith. Requires 1M+. $395. Semantic Microsystems, 4470 S. W. Hall, Beaverton, OR 97005. NCP (Aug 87)

Megamax C is an easy-to-use, full version of C. Has a compiler, ★★★★ linker, disassembler, editor, and much more. Good for beginners. Excellent documentation. $299.95. Megamax, PO Box 851521, Richardson, TX 75085. NCP

Microsoft BASIC was the Mac's first programming language. This ★★★★ interpreter (it's not a compiler) now supports the Toolbox and the whole Mac interface can be implemented in your programs. For nonprogrammers there are lots of programs available. $99. Microsoft, 16011 NE 36th Way, Redmond, WA 98073-9717. NCP ★'85 Eddy

MIDIBasic is a library of simple, but highly useful routines for writing ★★★★ MIDI software. Good stuff. Sketchy documentation. Works with both Microsoft and ZBasic. Requires 512K+ plus BASIC. $49.95. Altech Systems, 831 Kings Highway, Shreveport, LA 71119. NCP (Aug 87)

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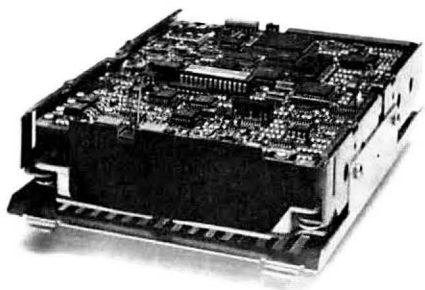
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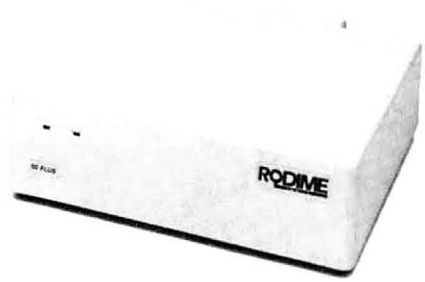
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MINIFINDERS



Object Logo is an object-oriented programming language with access to the Toolbox. Good product, but can't produce standalone applications. Requires 512K+. $79.95. Coral Software, PO Box 307, Cambridge, MA 02142. NCP (Aug 87)

Personal Prolog is an inexpensive and well-documented program. Has no debugging or search and replace facilities, making it a more appropriate tool for learning than development. Documentation and use of Mac interface are excellent. $64.95. Optimized Systems Software, 1221 B Kentwood Ave., San Jose, CA 95129. NCP (Mar 87)

Prolog/m is a solid Prolog following the Edinburgh standard. Has extensive debugging facilities, but you'll need separate Toolbox disk with 58 additional predicates. Drawback: no true editing or printing facilities. $99.95. Chalcedony Software, 5580 La Jolla Blvd., La Jolla, CA 92037. NCP (Mar 87)

QUED (Quality Editor for Developers) is the ultimate source code editor. Loaded with useful and well thought out features, it will make any programmer's life much easier. It is not a word processor, however. $65. Paragon Concepts, 4954 Sun Valley Rd., Del Mar, CA 92014. NCP (Mar 86)

TML Data Base Toolkit is an ISAM type database that provides fast and efficient administration of large data files in applications developed with TML compiler. Supports multiple open index files. $89.95. TML Systems, 4241 Bay Meadows Rd., Jacksonville, FL 32217. NCP (Dec 86)

TML (MacLanguage Series) Pascal is a good Pascal compiler, capable of producing standalone programs. Can use most existing Lisa Pascal programs with only slight modification. Requires 512K+. $99.95. TML Systems, 4241 Bay Meadows Rd., Jacksonville, FL 32217. NCP (Jun 86) ★'86 Eddy

TML Source Code Library shows how to write programs that use custom definition routines, speech, serial drivers, split bars, and other topics. Provided on three 400K diskettes. Requires TML Pascal. $79.95. TML Systems, 4241 Bay Meadows Rd., Jacksonville, FL 32217. NCP (Dec 86)

Visual Interactive Programming is a unique visual programming system for creating simple Macintosh applications. Programs are constructed in a flowchart-type manner. Easy access to most toolbox routines. $149.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP (Jun 87)

ZBasic is a fast, interactive compiler capable of creating standalone applications that take advantage of Mac's unique features and abilities. Includes Edit, RMaker and MacInTalk. Requires 512K+. $89.95. Zedcor, 4500 E. Speedway Blvd., Tucson, AZ 85712. NCP (Dec 86)

EDUCATION

Alphabet Blocks teaches prereaders the letters and sounds of the alphabet. The digitized voice of an on-screen elf is clear and pleasant. Very intuitive. Requires 1M+. $49.95. Bright Star Technology, 14450 N.E. 29th Place, Bellevue, WA 98007. NCP (May 88)

American Discovery is an interactive United States geography game that teaches states, capitals, and, in a roundabout manner, postal codes. Suffers from small maps. Requires 512K+. Great Wave Software, 5353 Scotts Valley Dr., Scotts Valley, CA 95066. NCP (May 88)

Business Simulator is a training tool in a simulation game. Make decisions that manage the company through several stages over 25 years. Decisions become more difficult over time. Requires 1M+, 2 disk drives (one must be 800K). May be run from a hard disk. $69.95. Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404. NCP (Dec 87)

ChipWits is a combination game and teaching tool. Players create programs to maneuver robots through a set of 8 mazes. The programs are written in ChipWit's built-in icon- based programming language (IBOL). $49.95. BrainPower, 24009 Ventura Blvd., Calabasas, CA 91302. NCP ★'85 Eddy

Course Builder v. 2.0 creates standalone educational applications. An easy-to-learn dedicated programming language uses blocks and arrows. Graphics, animation and sound can be integrated. Version 2 allows mathematical calculations. Poor documentation. $395, plus $10 shipping. TeleRobotics International, 8410 Oak Ridge Highway, Knoxville, TN 37931. NCP (Oct 87)

KidsTime is a package of five quality educational programs for children between the ages of 3 and 12. The programs all have adjustable difficulty levels. Some use speech and one is a nice introduction to musical notes. Sparse documentation. $49.95. Great Wave, 5353 Scotts Valley Dr., Scotts Valley, CA 95066. NCP (Oct 86) ★'86 Eddy

LearnWord 3.0 is a three-part series of cassette tape/diskette modules that explain the intricacies of Word 3.0. They do the job, but remind you why cutting classes was more fun. $49.95 per module. Personal Training Systems, PO Box 54240, San Jose, CA 95154. (Apr 88)

LXR•Test generates tests from a database of questions. Makes it easy to modify and scramble test questions. Flexible output. Requires Mac 512E+, two 800K drives, or a hard-disk drive. $199 or $399, depending on features. Logic eXtension Resources, 9651 Business Center Dr., Rancho Cucamonga, CA 91730. NCP (May 88)

MacEdge and **MacEdge II** each contain 8 reading or math drill programs for basic skills. Programs follow one of three formats, a bit contrived. Contrivances are design flaws. $49.95 each. Think Educational Software, 16 Market St., Potsdam, NY 13676. CP

MacType offers structured typing instruction. Can teach both standard and Dvorak keyboards. Features include certificates for reaching certain levels. Can be used in a multistudent environment. $49.95. Palantir Software, 12777 Jones Rd., Houston, TX 77070. CP

MasterType is proof that learning to type can be fun. In this arcade-style action game words descend from four corners towards the center ship; the user must type them correctly. Features 18 skill levels, tracks errors, recommends lessons and provides comparison scores. $49.95. Mindscape, 3444 Dundee Rd., Northbrook, IL 60062. CP

On Becoming a Desktop Publisher is a video training tape based largely on the syndicated television program, "The Computer show." Good primer on the fundamentals of DTP products. Will eventually become dated. Requires Beta or VHS VCR. $49.95. Ocean Communications, 1641 North First St., Suite 160, San Jose, CA 95112. (Sep 88)

Practica Musica uses an interactive game and practice approach to teach music theory and ear training. Excellent training tool for the serious music student, it is also fun for anyone who wants to develop a trained ear for intervals, chords, and melodies. Requires 512K+. $125. ARS Nova Software, P.O. Box 40629, Santa Barbara, CA 93140. NCP (Nov 87) ★'87 Eddy

Reader Rabbit teaches 4-to-8-year olds how to read in four elegant games that play and build off of each other. Requires 512KE+ and an 800K drive. Mac II and MultiFinder hostile. Version 2.0 reviewed. $59.95. The Learning Company, 6493 Kaiser Dr., Fremont, CA 94555. CP (Jun 88)

Sensei Physics is a capable, intelligent, well-designed study aid. Covers Vectors to Thermodynamics to The Nature of Light. Animated experiments let you try out concepts. Requires 512K+. $99.95. Broderbund Software, 17 Paul Dr., San Rafael, CA 94903. CP (Jan 88)

Subli-Mac is a self-hypnosis program, combining subliminal, relaxation, and positive-self-image techniques. Flashes a brief user-written message (against a diversionary pattern) at your subconscious. Dangerous near hard disks. Manual suf-

fers from terminal California-ese. $39.95. Psy-Den, PO Box 248, Champlain, NY 12919. NCP (Jan 88)

Type! teaches typing to the hunt-and-peck crowd. Lots of stats for ♦♦♦♦ speed and accuracy. One flaw: it's aimed more at typing on a typewriter rather than on a computer keyboard. Version 1.0. Requires 512K. $44.95. Broderbund, 17 Paul Drive, San Rafael, CA 94903. NCP (Oct 88)

ENTERTAINMENT

The Ancient Art of War gives users a chance to refight some ♦♦♦♦½ famous campaigns on both strategic and tactical levels. Campaigns can also be designed from scratch. Very playable, addicting game. Requires 512K+ Mac. $44.95. Broderbund, 17 Paul Dr., San Rafael, CA 94903. CP (Apr 86)

Apache Strike would have been an excellent arcade game in the ♦♦ late '70s. Now, it's passe. Navigate a helicopter to destroy ever-increasing numbers of enemy aircraft and tanks. Mac II hostile. Requires 512K+. $49.95. Silicon Beach Software, P.O. Box 261430, San Diego, CA 92126. NCP (Jul 88)

Archon pits the forces of Light against Dark in a quest to gain control ♦♦♦♦½ of five Power Points on a checkerboard grid. The shifting cycles of squares' colors keep the balance of power ever-changing. One or two players. $39.95. Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404. CP (Oct 86)

Balance of Power is the world's first computer peacegame. This ♦♦♦♦♦ simulation allows players to become either the President of the United States or General Secretary of the Soviet Union. Extraordinary artificial intelligence routines and general play make this a classic. $49.95. Mindscape, 3444 Dundee Rd., Northbrook, IL 60022. CP (Prem)

Battle Stations is a deceptively simple game based on the pen and ♦♦♦♦ paper game of Battleship. Requires strategy on several levels. Makes excellent use of Mac sound and graphics. Fun, casual game, especially when the Mac is one of the players. Requires 512K+. $30. Timeline, PO Box 60, Ypsilanti, MI 48197. NCP (Jun 87)

Beyond Dark Castle brings back Prince Duncan in an encore per- ♦♦♦½ formance to run, jump, and beat his way to victory. But really, just more of the same. Requires 512KE. $49.95, Silicon Beach Software, P.O. Box 261430, San Diego, CA 92126. NCP (Aug 88)

Beyond Zork is yet another installment in the famous Zork series of ♦♦♦♦½ text adventures. Find the fabled Coconut of Quendor to restore failing magic in this expert-level game. On-screen mapping and the Mac's window environment are utilized. $49.95. Infocom, 125 CambridgePark Dr., Cambridge, MA 02140. NCP (Apr 88)

Bureaucracy is a paranoiac text adventure that dares you to move ♦♦♦½ to a new house and job and still maintain some degree of sanity, not to mention a low blood pressure. Written by Douglas Adams of Hitchhiker's fame. $39.95. Infocom, 125 CambridgePark Dr., Cambridge, MA 02140. NCP (Aug 87)

The Chessmaster 2000 is a masterful chess program that will ♦♦♦♦♦ appeal to both novice and master. You can view the board from 2- or 3-D perspective and turn the board for a better look. Play is smooth and easy, and the program responds by voice. You may get tired of hearing "Gotcha," though. $39.95. The Software Toolworks, 13557 Ventura Blvd., Sherman Oaks, CA 91423. CP (Jul 87)

Crystal Quest combines all the good elements of nearly every video ♦♦♦♦½ game ever made. Move a piece around to gobble up points and crystals. Shoot the nasties and get through the goal before they get you. Excellent sound effects. In color on the Mac II. Requires 512K+. Greene, 15 Via Chualar, Monterey, CA 93940. CP (Apr 88)

Dark Castle is an outstanding achievement in action games which ♦♦♦♦♦ integrates RealSound with superb animation and graphics. You'll need better-than-average hand/eye coordination, but it's well worth the effort. Requires 512K+. $39.95. Silicon Beach, PO Box 261430, San Diego, CA 92126. NCP (Apr 87) ★'87 Eddy

Deja Vu: A Nightmare Comes True is a graphic adventure that ♦♦♦♦♦ breaks new ground. Innovative use of the Mac interface in truly playable and exciting game. A great introduction to graphic adventure games. $49.95. Mindscape, 3444 Dundee Rd., Northbrook, IL 60062. CP (Jan 86) ★'85 Eddy

Down Hill Racer is an action game with three skier personalities, ♦♦♦♦ four courses and four skill levels. There's something here for every player, no matter how bad or good. Full digitized sound (very nice!) $49.95. Miles Computing, 7741 Alabama Ave., Canoga Park, CA 91304. CP (Sep 87)

Enchanted Scepters is a surround-sound graphic adventure game. ♦♦♦♦ It has a limited vocabulary and virtually no story. Offers extensive and varied scenes and utilizes the Mac interface to the fullest. $39.95. Silicon Beach, PO Box 261430, San Diego, CA 92126. CP (May 86)

Falcon simulates an F-16 fighter jet with gut-tightening, sweat- ♦♦♦♦½ making realism. Go against MiGs and dodge SAMs scenarios. Requires 1M+. $49.95. Spectrum HoloByte, 2061 Challenger Dr., Alameda, CA 94501. NCP (May 88)

Ferrari Grand Prix is an exciting race car simulation game. Master- ♦♦♦♦ ing it takes quite a bit of time and effort. Startup course and four other courses are built into the program. You can also design your own courses and backgrounds. Requires 512K+. $59.95. Bullseye Software, PO Drawer 7900, Incline Village, NV 89450. CP (Jul 87)

Flight Simulator puts you at the controls of a small plane (prop or ♦♦♦♦ jet) and lets you roam North America. As difficult as real flying. Mac version has features not found on earlier versions, including spotter aircraft. Not all features available on 128K. $49.95. Microsoft, 16011 NE 36th Way, Redmond, WA 98073-9717. CP (Nov 86)

Fokker Triplane is about as near to flying as you can get seated in ♦♦♦♦ front of a computer. Very realistic simulation and excellent graphics. Well-designed and implemented. $59.95. Bullseye Software, PO Drawer 7900, Incline Village, NV 89450. CP (Feb 86)

Fool's Errand is an outstanding collection of 80 puzzles woven ♦♦♦♦♦ around a mythical theme of an evil priestess and the search for wisdom. Requires 512K+. $49.95. Miles Computing, 7741 Alabama Avenue, Canoga Park, CA 91304. NCP (Jul 88)

GO is the Chinese equivalent of chess. Players plonk markers on a ♦♦♦½ grid to gain territory and outwit an opponent or the computer. Requires 512K+. Mac II hostile; MultiFinder friendly. Version 1.0 reviewed. $49.95. Infinity Software, 1144 65th St., Studio C, Emeryville, CA 94608. NCP (Jun 88)

Grand Slam is an absorbing and realistic tennis simulation game. ♦♦♦♦ Practice or play tournament against Mac-controlled players with different styles and abilities on four different surfaces. 512K or Mac Plus. $49.95. Infinity Software, 1331 61st St., Emeryville, CA 94608. CP (Nov 86)

Handwriting Analyst produces a personality profile based on an- ♦♦♦♦½ swers to questions about one's handwriting. It's simple and the results will amaze and astound. $49.95. Ciasa, 2017 Cedar St., Berkeley, CA 94709. NCP (Apr 88)

HardBall is a baseball simulation game complete with umpire's ♦♦♦♦ calls and crowd sounds. Great graphics and a lot of fun for fans. $44.95. Accolade, 5500 S. Winchester Boulevard, San Jose, CA 95128. CP (Feb 87)

Hollywood Hijinx substitutes a modern Hollywood estate for the ♦♦♦♦ famous Underground Empire, but otherwise represents a return to Zork gameplay and feel. There's even a maze to navigate. Simplistic, but good. $39.95. Infocom, 15 CambridgePark Dr., Cambridge, MA 02140. NCP (Jun 87)

7 Reasons Why Tecmar Tape Backup is Vital if You Own a Mac Hard Disk.

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Portable	No	Yes
Warranty	90 days	2 years
Experience in Tape Backup	None	4 years
Price	$1,495	$1,395

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John Rizzo—MacintoshToday: *"I recommend the Tecmar QT-Mac40 for its speed, portability, quality of construction and software interface."*

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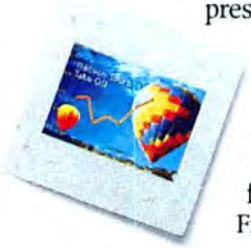
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Image captured with NuView. 8-bit mode, 256 colors. Charts created with Ready-Set-Show.

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MINIFINDERS



Klondike 3.3 is a version of solitaire that uses video game-like scoring to create a superb, totally addictive game. Simple to play, nearly impossible to stop playing. Shareware: $10. Unison Software, 415 Clyde Ave., Mountain View, CA 94043. NCP (Dec 87)

Leather Goddesses of Phobos is another in the long line of witty and entertaining Infocom text adventures. This one lets you choose your sex and comes with a 3-D comic and a scratch 'n sniff card. It has three levels of play: tame, suggestive and lewd. $39.95. Infocom, 125 CambridgePark Dr., Cambridge, MA 02140. NCP (Feb 87)

Lode Runner is a 150-screen action-strategy challenge. Move around a grid of ladders and platforms collecting treasure; dig a hole to trap pursuers. Build your own challenges. $14.95. Broderbund, 17 Paul Dr., San Rafael, CA 94903. CP

MacCourses adds four very challenging new courses to MacGolf. Courses are swapped on the original MacGolf master disk two at a time. Nice add-on for a good game. Requires MacGolf. $34.95. Practical Computer Applications, 1305 Jefferson Hwy., Champlin, MN 55316. CP (Apr 87)

MacMan is a two-part package. The software portion is a decent PacMan-like game. The hardware part is a tiny converter that lets you use a joystick with a Mac or Mac Plus. $39.95. Nuvo Systems, 225 Tank Farm Rd., San Luis Obispo, CA 93401. CP (Aug 87)

Mac Pro Football is a terrific sports simulation that gives you the chance to pit any combination of 38 Super Bowl teams against each other and direct team play. It comes with excellent, detailed (and necessary) documentation. Play selection can get a bit Byzantine. $49.95. Avalon Hill, 4517 Harford Rd., Baltimore, MD 21214. CP (Mar 87)

MacRacquetball uses digitized videos and sounds of professional players for a realistic simulation. Has lots of control settings and can be played against someone else over a modem or between hard-wired Macs. Turn off hard disks before playing. $59.95. Practical Computer Applications, 1305 Jefferson Hwy., Champlin, MN 55316. CP (Oct 87)

Maze Survival challenges players to destroy maze walls before roving bugs squash themselves against it. Bugs lay eggs to spawn a new generation. Repetitive. $34.95. Olduvai Software, 7520A Red Road, South Miami, FL 33143. NCP (Aug 87)

MazeWars+ is an interactive, multiplayer game to be played on AppleTalk or through a modem link. Chase opponents through a four-level maze. Requires 512K+, AppleTalk or Hayes-compatible modem. $49.95. MacroMind, 1029 W. Wolfam, Chicago, IL 60657. NCP (Nov 86)

Mind Over Mac features five games. Entertainment for the whole family. Good graphics paired with synthesized sound and on-screen help. $49.95. Think Educational Software, 16 Market St., Potsdam, NY 13676. CP (Feb 86)

MoonMist is an introductory level text adventure game. This is a typical haunted English castle story, not quite up to Infocom's best. It has four versions, so it's good for more than one play. $39.95. Infocom, 125 CambridgePark Dr., Cambridge, MA 02140. NCP (May 87)

MSFL: Pro League Football is a professional football league simulation that encourages people to play people, not the machine. Fast with lots of stats. Quirky MS-BASIC behavior. Spotty manual. No LaserWriter support. Requires 1M+. $49. MicroSports, PO Box 15799, Chattanooga, TN 37415. NCP (Apr 88)

NewGammon is animated backgammon that will challenge even good players. Features include variable skill levels and strategies and options to play the Mac or watch the Mac play itself. An arcade-like high speed mode is included. $39.95. Newsoft, PO Box 3046, Newport Beach, CA 92663. CP

NFL Challenge simulates coaching and watching professional football. Comes on two disks, one with program and System, the other statistical data. Play against either human or computer coaching. Plays are selected from pre-defined playbooks. $99.95. XOR Corp., 5421 Opportunity Ct., Minnetonka, MN 55343. NCP (Jun 87)

Ogre is a strategy tank game played on a hexagon grid. The ogre is an intelligent cybertank out to smash your command post. Customize your defense. Exceptionally good Mac in- terface. Has two-player option. $30. Origin Systems, 136 Harvey Rd., Building B, Londonderry, NH 03053. CP (Nov 87)

Orbiter puts a real space shuttle on the Mac screen. A multitude of controls, intelligent on-board computer with speech capabilities, real-time graphics, and 16 distinct missions help this program succeed as both a game and a simulation. $49.95. Spectrum HoloByte, 2061 Challenger Dr., Alameda, CA 94501. NCP (Jul 86)

Patton vs. Rommel is a traditional-style strategic war game. It covers events in Normandy in 1944. While complex, it's well-designed and very playable. $39.95. Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404. CP (Apr 87)

The Pawn is an unusual British interactive adventure game with text and graphics. The unique interface has some drawbacks, but The Pawn has humor, social satire, is entertaining, and is challenging. $44.95. Requires 1M+. Firebird, PO Box 49, Ramsey, NJ 07446. CP (Mar 87)

Pinball Construction Set lets users create their own pinball games, as elaborate or as easy as desired. Uses MacPaint for backgrounds and has lifelike sounds (on 512K+ Macs). $39.95. Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404. CP (Jan 86)

Plundered Hearts brings gothic romance to interactive fiction in the familiar Infocom mode of puzzles, mazes, and riddles. You play a 17th-century heroine dodging pirates to rescue her wrongly imprisoned father. Medium difficulty. $39.95. Infocom, 125 CambridgePark Dr., Cambridge, MA 02140. CP (Jan 88)

Portal is an intriguing science fiction novel for kids that suffers from having a poor interface. Storyline: All of humanity is missing and you have to search through a database for files that reveal the mystery. Nothing in the way of role-playing, and the Mac version is slow and buggy. $49.95. Activision, 3885 Bohannon Drive, Menlo Park, CA 94025. CP (Oct 87)

PT-109 by any other name is Gato, a WWII submarine simulator also put out by Spectrum. Three year old technology with a minor face lift. Version 1.0. Requires 512K. Mac II friendly; MultiFinder hostile. $49.95. Spectrum HoloByte, 2061 Challenger Dr., Alameda, CA 94501. NCP (Sep 88)

Puppy Love is a combined game and teaching tool. As you teach your puppy tricks and routines, you learn the basics of programming logic. Great fun for all ages. Does not run from a hard disk. $29.95. Addison-Wesley, Route 128, Reading, MA 01867. CP (Mar 87)

Quarterstaff (v. 1.2) is a fantasy adventure game of the typical "good vs. evil" variety. Ability to use characters in other adventures gives this game a lot of potential for development. Requires 1M+. $49.95. Simulated Environment Systems, 800 South Pacific Coast Hwy., Redondo Beach, CA 90277. NCP (Mar 88)

Seven Cities of Gold is an educational program masquerading as an adventure game and is practically unique in being equally good in both respects. You are to land (not the easiest part) in the New World and attempt to placate the natives, seed a few missions and collect gold. Nice work if you can get it. $39.95. Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404. CP (Jun 87)

Shadowgate is an icon-based graphic adventure. You, as the seed of prophecy, must save the world from the evil warlock. Far surpasses all others with great animated graphics, sound, and adventure. $49.95. Mindscape, 3444 Dundee Rd., Northbrook, IL 60062. CP (Dec 87)

MINIFINDERS

Shanghai challenges players to clear a board of all 144 tiles by ★★★★★ matching pairs of mah-jongg tiles and removing them. Terrific strategic options plus the ability to randomly generate new game boards keep this one fresh. $44.95. Activision, 3885 Bohannon Drive, Menlo Park, CA 94025. CP (Nov 86) ★'86 Eddy

Snake-Bar lets you guide a snake (or train or semi) through a maze, ★★★★ picking up objects that feed and make your snake grow. Options include changing languages, editing the maze, and an X-rated game. $15. (shareware). Georges Malmound, 37 Bis rue des Abbesses, Montmartre, 75018 Paris, France. NCP (Dec 87)

Solitaire Royale is a collection of eight solitaire card games. The ★★★★ Tour mode cycles through each game. Tournament deals the same hand for several players. $34.95. Published by Spectrum Holobyte, 2061 Challenger Dr., Alameda CA 94501. CP (May 88)

Space Quest is a three-dimensional, animated adventure in which ★★★★ you play a janitor in a dicey situation. All you have to do is get off your ship before it explodes and save the Earnon System. Runs on any Mac. $49.95. Sierra On-Line, PO Box 485, Coarsegold, CA 93614. CP (Sep 87)

Star Fleet I: The War Begins! is a space opera of the Star Trek ★★★★ variety. Rise through the ranks from ensign to admiral in this serialized adventure. Requires 512K+. $55. Interstel, PO Box 57825, Webster, TX 77598. NCP (May 88)

Stationfall is the sequel (finally) to Infocom's excellent Planetfall ★★★★½ text adventure. Reunited with Floyd and sent to pick up requisition forms, you must solve the empty space station problem. As straightforward as other Infocom games; more so than some. $39.95. Infocom, 125 CambridgePark Dr., Cambridge, MA 02140. NCP (Nov 87)

Strategic Conquest Plus challenges you to discover an unexplored ★★★★½ world and conquer it by manufacturing and deploying armies, ships, and planes. A two-disk game that doesn't support an external drive. Requires 512K+. $59.95. PBI Software, 1111 Triton Dr., Foster City, CA 94404. CP (Feb 88)

Sub Battle Simulator is a superior naval combat game. Sixty differ- ★★★★ ent missions and the ability to link missions keep it from ever getting boring. Requires 512K+. $39.95. Epyx, PO Box 8020, Redwood City, CA 94063. NCP (Aug 87)

Tass Times in Tone Town is a slightly off-the-wall graphic adven- ★★★½ ture in which you need a flashy hairdo and a jumpsuit before you can get anywhere, and you pay for things with guitar picks. Decent puzzles, with a sense of humor. $4.95. Activision, 3885 Bohannon Drive, Menlo Park, CA 94025. CP (Jan 87)

The Toy Shop is a construction kit for building 20 different working ★★★★ model toys. Some parts can be customized. Manual gives clear instructions, but many toys are too complex for a child. $49.95. Broderbund, 17 Paul Dr., San Rafael, CA 94903. CP (Nov 86)

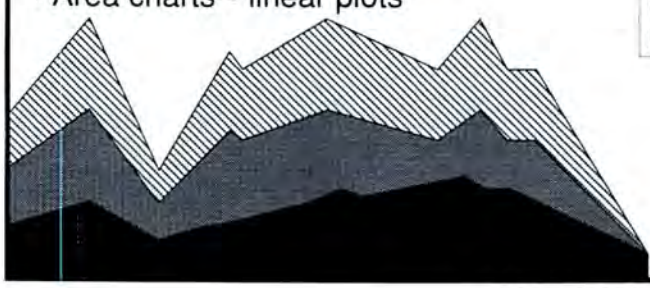
Trust & Betrayal: The Legacy of Siboot requires negotiating with ★★★★½ six artificial personalities in a struggle for power — not surprising considering that it comes from the maker of Balance of Power. Uses hieroglyphics to communicate in a fantasy world. Requires 512K+. Mindscape, 3444 Dundee Rd., Northbrook, IL 60062. CP (Mar 88)

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MINIFINDERS



Ultima III allows up to four characters to cooperate to explore the ♦♦♦♦½ vast wilderness of Sosaria. $59.95. Origin Systems, 340 Harvey Rd., Manchester, NH 03103. CP

Uninvited is an icon-based adventure game set in an extremely ♦♦♦♦♦ haunted mansion. Since you access the parser by double-clicking, command choices are always visible — you don't waste time trying to figure out which words the program understands. It has animation and sound. $49.95. Mindscape, 3444 Dundee, Northbrook, IL 60062. CP (Sep 86) ★'86 Eddy

Wizardry is an outstanding dungeon exploration adventure pitting a ♦♦♦♦♦ party of up to six characters against the guardian monsters of the evil wizard Werdna. Capture his amulet to earn your reward. Even after solving the game, you'll want to go back into the dungeon. $59.95. Sir-Tech, Charlestown-Ogdensburg Mall, PO Box 245, Ogdensburg, NY 13669. CP

Xyphus is a role-playing game pitting four characters (fighters or ♦♦♦♦ wizards) against multiple scenarios that grow increasingly harder. Excellent Mac interface and icon control. $39.95. Penguin, PO Box 311, Geneva, IL 60134. CP

Your Personal Poet creates personalized greeting cards on the ♦♦♦½ Mac. Comes complete with four greeting cards and matching envelopes. Requires 512K+. $29.95. Computer Poet, 775 E. Greg St., Sparks, NV 89431. NCP (Jun 87)

Zork II is where the adventure continues in the underground ♦♦♦♦½ empire. A wandering wizard keeps things interesting, though there's a way to beat him if you persevere. $44.95. Infocom, 125 CambridgePark Dr., Cambridge, MA 02140. NCP

Zork III is the final chapter in the trilogy. Players come up against the ♦♦♦ ultimate enemy — the Dungeonmaster himself. More closed-ended than previous Zorks. $44.95. Infocom, 125 CambridgePark Dr., Cambridge, MA 02140. NCP

MUSIC

Alchemy loads and edits digitally sampled sounds from most com- ♦♦♦♦♦ mercial samplers. Works with 512K, but it eats up memory quickly. Requires MIDI or RS-422 interface, and sampler. $495. Blank Software, 1477 Folsom Street, San Francisco, CA 94103. CP (Oct 88)

Apple MIDI Interface is a simple Musical Instrument Digital Inter- ♦♦♦ face with a 1 MHZ clock rate. Has only one MIDI input and one output. Works with all Macs; adaptor required for 128K and 512K. $99. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (Jun 88)

Beaverton D-50 Editor/Librarian is one of the most innovative but ♦♦♦ least intuitive editor/librarians available for the Mac. Randomization masks, Crosstalk system, Universal Algorithmic Slider. Version 1.01, $199. Beaverton Digital Systems, P.O. Box 1626, Beaverton, OR 97075. CP (Oct 88)

ConcertWare+ is an enhanced version of ConcertWare. Has differ- ♦♦♦♦ ent instruments and can use any four of a set of eight at any point in a piece. Supports Adobe Sonata music font. $69.95. Great Wave Software, 5353 Scotts Valley Dr., Scotts Valley, CA 95066. NCP (Dec 87) ★'85 Eddy

ConcertWare+MIDI is a composition and transcription program ♦♦♦♦ that can record multiple notes from a MIDI keyboard. Easy to

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MINIFINDERS

use if you read music. Handles eight tracks of eight voices each. Requires 512K. Version 4.0. $149.95. Great Wave Software, 5353 Scotts Valley Dr., Scotts Valley, CA 95066. NCP (Dec 87)

Deluxe Music Construction Set lets you enter up to 48 voices on ♩♩♩♩ eight staves, and play the music through the Mac's internal speaker and/or via MIDI. Requires 512K+. Mac II and MultiFinder hostile. Version 2.0 reviewed. $99.95. Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404. CP (Jun 88)

Dr. T's Roland D-50 Editor/Librarian is solid, reliable and entirely ♩♩♩½ intuitive. Great sound auditioning. Little in the way of patch generation. Version 1.0. $175. Dr. T's Music Software, 220 Boylston St., Suite 306, Chestnut Hill, MA 02167. CP (Oct 88)

Jam Factory is a program for performing complex manipulations on ♩♩♩ MIDI data in real time. Unique, entertaining, and very powerful, but requires lots of patience and practice. Requires 512K+, MIDI interface, and MIDI synthesizer. $189. Intelligent Computer Music Systems, PO Box 8748, Albany, NY 12208. CP (Oct 87)

Jam Session is a music program for those who think MIDI refers to the ♩♩♩♩ length of skirts. Without any skill, you can "Jam" with rock, jazz, rap, or country tunes. A sort of "Sing Along With Mitch" for the computer set. Requires 512K+. $49.95. Broderbund, 17 Paul Drive, San Rafael, CA 94903. CP (Jul 88)

Listen is an educational tool for ear training. It has both a piano ♩♩♩♩ keyboard and a guitar fretboard for the student to input notes, and offers a wide range of exercises. $99. Resonate, PO Box 996, Menlo Park, CA 94026. (Jan 87)

M is a music composition and creation program that works with MIDI ♩♩♩ data in real time. Unique, entertaining, and very powerful, but requires lots of patience and practice. Requires 512K+, MIDI interface, and MIDI synthesizer. $219. Intelligent Computer Music Systems, PO Box 8748, Albany, NY 12208. CP (Oct 87)

Master Tracks Pro is a full-featured, second-generation MIDI se- ♩♩♩♩½ quencer that adheres to the Mac interface very well. It's the first program to have graphic-controller editing. Needs patch chasing for professional use, but it's still a rock-solid program. $350. Passport Designs, 625 Miramontes St., #103, Half Moon Bay, CA 94019. CP (Dec 87)

Music Mouse is a music program in a genre all its own. Called an ♩♩♩♩♩ "intelligent instrument," Music Mouse gives you instant musical feedback as you move the mouse and type on the keyboard, which controls tempo, vibrato, volume, etc. $59.95. OpCode Systems, 444 Ramona St., Palo Alto, CA 94301. NCP (May 87)

Opcode D-50 Editor/Librarian is the industry standard in music ♩♩♩♩ editors. Comprehensive features including randomizing functions and Library and Bundle files. Poor screen layouts. Version 5.01. $250. Opcode Systems, 1024 Hamilton Court, Menlo Park, CA 94025. CP (Oct 88)

Performer v. 2.2 is the definitive MIDI sequencer, and is priced ♩♩♩♩ accordingly. Includes looping, SMPTE synching, 32 simultaneous Ins and Outs, unlimited overdubbing, and compatibility with Professional Composer for transription. Requires MIDI interface and 512K+. $395. Mark of the Unicorn, 222 Third St., Cambridge, MA 02142. CP (Jan 88)

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Professional Composer produces performance-quality sheet music using Adobe's Sonata font. Scores can be created from scratch or imported from Performer (and can be exported to Performer for MIDI playback). Requires 512K+. $495. Mark of the Unicorn, 222 Third St., Cambridge, MA 02142. CP (Jan 88)

Softsynth creates sounds for additive synthesis samplers. Downloading from Mac to sampler is time consuming. Requires 512K, sampler, MIDI interface. $295. Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025. CP (Oct 88)

Sound Designer set the standard for editing samples on lower-cost samplers, but it still lacks real-time high-fidelity playback. Requires 512K, sampler, MIDI interface. $495. (Emax, E II, 2000/2002, DSS-1, S900); all others, $395. Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025. CP (Oct 88)

Studio Session consists of two programs, an Editor, and a Player, that produce music with six voices of digitized sound. Excellent program plus good manual make this a good buy. $89.95. Bogas Productions, PO Box 6699, Terra Lina, CA 94903-0699. NCP (Aug 87) ★'86 Eddy

Turbosynth creates sounds for a digital sampler using modular synthesis techniques. Good harmonic spectral inverter. Lacks an easy method of multisampling. Requires 1 megabyte, sampler, MIDI interface. $349. Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025. CP (Oct 88)

UpBeat turns the Macintosh into a front panel for a highly complex and versatile drum machine. Input patterns with mouse, MIDI keyboard, or drum machine. Requires 512K. $150. Intelligent Music, PO Box 8748, Albany, NY 12208. CP (May 88)

Valhala D-50 Editor/Librarian is a reasonably solid program with clear editing features. Some incompatibilities with any DAs that access the serial port. Ver. 1.11. $131.50. Valhala Music, P.O. Box 20157-MU, Ferndale, MI 48220. NCP (Oct 88)

HARDWARE & ACCESSORIES

AST TurboScan is a 300 dpi scanner with sophisticated graphics software. Scans at resolutions from 72 to 300 dpi. SuperScan software offers halftone, line art, and mixed modes. "Virtual memory processing" lets you scan images too large to fit in RAM. $1899. Requires 512K+. SuperScan software included. AST Research, 2121 Alton Ave., Irvine, CA 92714. NCP (Nov 87)

Classic Professional Graphics Display is a low-cost color monitor for the Mac II. Good value, but has an IBM-look about it. Green tint is annoying. Requires Apple video card. $549. Classic Components, 1490 Artesia Blvd., Gardena, CA 90247 (Jun 88)

CMS S-140 SCSI Hard Disk is a very fast, high-capacity SCSI hard disk with a unity interleave and average access time of 18 msec. Holds 140M. Help, file transfer, and tape back-up commands built in. Hard Disk Partition is a useful DA. Comes with a 6 ft. SCSI cable. $2995. CMS Enhancements, 1372 Valencia Ave., Tustin, CA 92680. (Jul 87)

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MINIFINDERS

ColorVue SE is a video processor board for the Mac SE that lets you
ŧŧŧ display 16 colors on an exernal RGB monitor. Slows up performance. $695. Orchid Technology, 45365 Northport Loop West, Fremont, CA 94538. (Oct 88)

Data Frame 40XP is a very fast, very quiet 40-meg external SCSI
ŧŧŧŧ hard drive. Comes with a good and complete set of utility software. About as fast as a SCSI drive can be. Requires SCSI port, 512K+, new ROM. $1899. SuperMac Technology, 295 N. Bernardo Ave., Mountain View, CA 94043.

DaynaFile hooks up to a SCSI drive to read MS-DOS disks in the
ŧŧŧŧ Mac environment. Use Mac applications to manipulate data created with an IBM PC. Comes in both 5-¼ and 3-½ inch formats. $595 for single floppy. Dayna Communications, 50 S. Main St., 5th Floor, Salt Lake City, UT 84144. (Jan 88) ★'87 Eddy

Felix is an optical-tracking graphics tablet that replaces a mouse.
ŧŧŧŧ Precision mode gives pixel by pixel control. Doesn't collect dirt like a mouse does. The 6-inch square device is designed primarily for right-handed people. Works with Mac Plus. $149. Lightgate, 6202 Christie Ave., Emeryville, CA 94608. (Sept 88)

FX-20 is a good 20-meg external hard drive. Good utility software.
ŧŧŧŧ Reliable and reasonably quiet. Sits next to Mac, has a large, oddly shaped case. Requires SCSI port, 512K+, new ROM. $1199. General Computer, 215 First St., Cambridge, MA 02142. (Feb 87)

Hard Disk 20SC is Apple's 20-meg SCSI hard disk. Reliable, fairly
ŧŧŧŧ noisy unit. Good utility software, but no back-up yet. Requires cable and terminator ($80). Requires SCSI port, 512K+, new ROM. $1299. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (Feb 87)

Hewlett-Packard ColorPro Graphics Plotter is an eight-pen desk-
ŧŧŧ top plotter that requires third-party software to drive it. Fonts are limited to an optional Graphics Enhancement Cartridge that requires some BASIC programming. $1295. Hewlett-Packard, 16399 W. Bernardo Dr., San Diego, CA 92127. (Feb 88)

HyperDialer provides an interface between a phone and your Mac
ŧŧŧ½ so you can "dial" a number using one of the Rolodex-type programs, like SideKick, Focal Point or QuickDex. Hooks up between the Mac's sound port and a telephone handset. Requires 128K. MultiFinder friendly. $39.95. DataDesk International, 7651 Haskell Ave., Van Nuys, CA 91406. (Sept 88)

ImageMaker shoots 35mm color slides direct from the Mac. Sup-
ŧŧŧŧ ports most presentation software. Uses patterns to represent colors. Not fully compatible with the Mac II. Requires 512K+. $4995. MacDriver software, $149. Presentation Technologies, 743 North Pastoria Ave., Sunnyvale, CA 94086. (Feb 88)

IS/ONE tablet with **Penworks** software lets you use a corded or
ŧŧŧ½ cordless pen or mouse and a high-res tablet for precise graphics input. Minor bugs with some applications and DAs. Keystroke macros can be launched from the tablet. Minimal documentation. Requires 1M+. $595 to $1145. Kurta, 4610 S. 35th St., Phoenix, AZ 85040. (Jan 88)

Jasmine Direct Drive 50 is a very quiet 1:1 interleave 50 megabyte
ŧŧŧŧŧ hard drive and one of the fastest SCSI drives around. A small

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MINIFINDERS

fan keeps it cool, but it's still quiet. $1159. Jasmine Technologies, 555 De Haro St., San Francisco, CA 94107. (Mar 88) ★'87 Eddy

LaserWriter II NT is Apple's mid-priced PostScript laser printer. It's faster than the LaserWriter Plus, with blacker blacks. Gray scale is less even than that of Plus. Requires 512K+. $4599. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (May 88)

Laser Writer II NTX is Apple's top-of-the-line PostScript laser printer. 68020 chip makes it very speedy; expandable to 12M; SCSI hard disk can be attached for fonts. Requires 512K+. $6599. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (May 88)

LaserWriter II SC is Apples's low-end QuickDraw laserprinter. Can be upgraded to NT or NTX; reasonably fast. Requires 1M+. $2799. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (May 88)

MacADIOS II is a hardware and software interface for laboratory instruments. Standard configuration samples up to 142 kHz. Documentation is sketchy. $1290 for Macintosh II-ready data acuisition card; $600 for MacADIOS II software interface. GW Instruments, 264 Msgr. O'Brien Hwy., Cambridge, MA 02141. (Jul 88)

MacBottom 45 SCSI and Internal Modem has a modem that fits into the top half of the 45-megabyte SCSI hard-drive case. Comes with HFS Backup and Eureka. $1795. PCPC, 4710 Eisenhower Blvd., Tampa, FL 33634.(Oct 87)

MacBottom HD21 is a very low (about 2 inches high), external 20-meg hard drive. Fits under the Mac. Very quiet, very reliable. Good utility software, including HFS Backup. Requires SCSI port, 512K+, new ROM. $1195. PCPC, 4710 Eisenhower Blvd., Tampa, FL 33634. (Feb 87) ★'86 Eddy

Macintizer is a graphics tablet and absolute positioning device that replaces the mouse. Various scales are possible. $599. GTCO Corp., 7125 Riverwood Dr., Columbia, MD 21046.

MacLarger is a 12-inch external monitor for 512K machines on up to the SE. Displays the same number of pixels as an internal monitor, only one-third larger. Bigger and brighter, but less crisp than the Mac's own screen. $449. Power R, 1606 Dexter Ave. North, Seattle, WA 98109. (Apr 88)

MacPacq transforms the Macintosh into a digital oscilloscope, waveform generator, and chart recorder. PacqManager software expandable via external routines in Turbo Pascal and other languages. Version 1.03 reviewed. $995. Biopac Systems, 42 Aero Camino, Goleta CA 93117. NCP (Jul 88)

MacRecorder is an easy-to-use sound digitizer. Includes software to turn sounds into HyperCard buttons, mix sounds, add special effects, and convert sound formats. Stereo recording possible on a Mac II. Requires 512K+. $199, Farallon Computing, 2150 Kittredge St., Berkeley, CA 94704. NCP (Jun 88)

MacSnap Plus 2 is a 2M memory upgrade for the Mac Plus. The board has 256 kilobit chips. User installable. Not compatible with existing big screens or internal hard disks, and can't be expanded further. $399. Dove Computer, 1200 North 23rd St., Wilmington, NC 28405. (Jun 87)

MacTable is an elegant Danish worktable that holds a Mac and printer with room to spare. The 30-inch deep by 60-inch wide table is

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MINIFINDERS



made of particleboard and must be assembled. Cabinet is optional. Table, $289; cabinet, $139. ScanCoFurn, PO Box 3217, Redmond, WA 98073-3217. (Mar 88)

MacTilt/MacTilt SE is a Mac (and external drive) holder that allows ★★★★ a full range of swiveling and tilting. Very strong, this well-made unit is also very easy-to-use. $99.95. Ergotron, PO Box 17013, Minneapolis, MN 55418.

MacVision is a digitizer that uses an ordinary video camera for ★★★★ input. Capable of extremely fine results and special effects. Easy to use and well-documented. $349.95. Koala, 269 Mt. Hermon Rd., Scotts Valley, CA 95066.

Mac-101 is a keyboard alternative that has a good feel to it. Has a ★★★★ keypad, 15 function keys, and more. The 101-Keys desk accessory lets you define macros. Comes in an ADB version for the SE and II. Requires 512K+. $169.95. DataDesk International, 7650 Haskell Ave., Van Nuys, CA 91406. Software NCP (Apr 88)

Magic Digitizer is a hardware digitizer that works with video cam- ★★★★ eras. With LaserMagic software you can generate 300 dpi images (in PostScript). Requires 512K+. Digitizer with Magic software, $399.95; LaserMagic software, $49.95. New Image Technology, 10300 Greenbelt Rd., Seabrook, MD 20706. NCP (May 87)

Microtek MSF-300C is a 300-dpi flatbed scanner. Really fast when ★★★½ used with optional MS-SCSI/C adapter. Comes with VersaScan Plus software (NCP) to scan and manipulate image. Saves images in a number of formats including TIFF and MacPaint. $1895. Microtek Lab, 16901 S. Western Ave., Gardena, CA 90247. (Dec 87)

Migent Pocket Modem is a 300/1200 baud portable modem ★★★½ about the size of a 3 X 5 index card. Comes bundled with MacTerm 2.0, Borland's telecom DA. Manual is confusing, and tech support is minimal. $259. Migent, 865 Tahoe Blvd., Incline Village, NV 89450-6062. (Nov 87)

Mouse Mover is a mouse pad-type surface that snaps onto the ★★★★½ bottom of the mouse like a roller skate, freeing it up to glide over desk or mouse pad with ease. 99 tiny ball bearings at three strategic points. Mouse glides faster and saves on mouse wear and tear. $19.95. Magnum Software, 21115 Devonshire St., Chatsworth, CA 91311. ★'85 Eddy

Moustrak is a fabric covered foam mousing pad. It will increase the ★★★★ efficiency of your mouse while helping to keep it clean. Pad comes in a variety of colors. Particularly useful in the typical office desktop environment. $10. Moustrak, 3047 St. Helena Hwy., St. Helena, CA 94574.

NetModem is a 1200-baud modem that can be accessed by all ★★★★ users on an AppleTalk network. The modem's display lights and the dial tone are simulated on screen. Requires 512K+. $599. Shiva, Suite 1200, 222 Third St., Cambridge, MA 02142-9919. (Feb 88)

NoLabelSystem is a plastic permanent labeling system in which ★★★★ users slide new tabs into a transparent plastic case on the disk. The tabs stick out of the case slightly, making them easier to read while in the drive. $19.45. Weber & Sons, 3468 Hwy. 9, Freehold, NJ 07728.

One Plus One is a user-installable memory upgrade for a Mac Plus. ★★★★½ Adds 1 megabyte of RAM to the 1M already there. Simple

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MINIFINDERS

one-evening project. Includes MacBreeze, an excellent small fan. Requires Mac Plus. $375. Levco, 6160 Lusk Blvd., San Diego, CA 92121. (Aug 87)

Personal LaserPrinter is a non-PostScript laser printer at a great ¢¢¢¢ price. Clumsy workarounds required in some applications. Printing can be slow. Requires 1M+. $1999; Fonts Plus, $299. General Computer, 580 Winter St., Waltham, MA 02154. (Apr 88)

Personal Writer PW15 S is a tablet-based handwriting recognition ¢¢¢¢ system that also allows graphics and macros. Number of misread characters is too high for general word processing. Requires 1M+. $895. Personal Writer, 1801 Ave. of the Stars, Los Angeles, CA 90067. Software NCP (Mar 88)

PhoneNET is an AppleTalk-compatible network. Network can be ¢¢¢¢¢ up to 3000 ft in length. In-place, unused phone cabling can be used for network, and can be combined with AppleTalk on same network. $49 per node. Farallon Computing, 2150 Kittredge St., Berkeley, CA 94704. (Dec 86) ★'87 Eddy

ProPoint replaces the mouse with an ADB trackball. Works better ¢¢¢ on the SE than it does on the Mac II. Lefties will find the button positions uncomfortable. Requires SE or Mac II. $139.95. Abaton, 48431 Milmount Drive, Fremont, CA 94538. (Oct 88)

QMS Colorscript 100 is the first color PostScript printer that uses a ¢¢¢¢ four color thermal wax transfer technology. Works on AppleTalk. Excellent typographic capability. Currently supports only a handful of applications. Requires 1 megabyte. $24,995. QMS, 1 Magnum Pass, Mobile, AL 36618 (Oct 88)

QMS-PS 810 is an 8-page-per-minute, 300-dpi PostScript laser ¢¢¢½ printer that competes with the LaserWriter NT. 2MB of RAM is standard; upgradable to 3MB. Emulates HP LaserJet, 7475 (HPGL), and Diablo 630. $5495. Laser Connection, 7852 Schillinger Park West, Mobile, AL 36608 (Jul 88)

QuickShare adds a SCSI port to an IBM PC for easy connectivity ¢¢¢ with a Mac. Can use an IBM's hard disk to run Mac applications. Requires SCSI port. Mac II and MultiFinder friendly. Version 1.24 reviewed. $465. Compatible Systems, P.O. Drawer 17220, Boulder, CO 80308. (Jun 88)

Radius Accelerator 25 can make your Mac SE run 50 percent ¢¢¢¢¢ faster than a Mac II. The add-in accelerator card has a Motorola 68020 CPU that runs at 25-megahertz, and an optional 25-megahertz 68881 math coprocessor. $1695; $2195 with optional 25-megahertz 68891. Radius, 404 East Plumeria Drive, San Jose, CA 95134. (Oct 88)

Tektronix 4693D Color Printer is a 300 dpi bit-mapped color ¢¢¢¢ printer. Colors look smooth and rich. Uses bit-mapped screen fonts; most type has noticeable jaggies. Requires Mac II with color monitor. Recommended 8-megabyte configuration, $11,490. Tektronix, P.O. Box 500, Beaverton, OR 97077. (Oct 88)

ThunderScan replaces the ribbon cartridge in an ImageWriter, ¢¢¢¢ which is required to use it. Laser scans art that can be run through the ImageWriter, producing high-quality digitized images. The images can be manipulated as they are created or afterward. $249. Thunderware, 21 Orinda Way, Orinda, CA 94563. ★'85 Eddy

TimeWand is a bar-code reader with a built-in time/date stamping ¢¢¢¢ clock. Can be used with TimeWand Manager software, a database that's extensive though difficult to use. Poor docs, but good support. Requires 1M+. TimeWand 2K version, $198; TimeWand Manager, $489. Videx, 1105 NE Circle Blvd., Corvallis, OR 97330-4285. (Dec 87)

TV Producer is an add-in card that overlays Mac graphics and text ¢¢¢ onto a video signal. Software is clumsy to use. Requires Mac II, Apple video card, and video souce. $599. Computer Friends, 14250 NW Science Park Dr., Portland, OR 97229. Software NCP (May 88)

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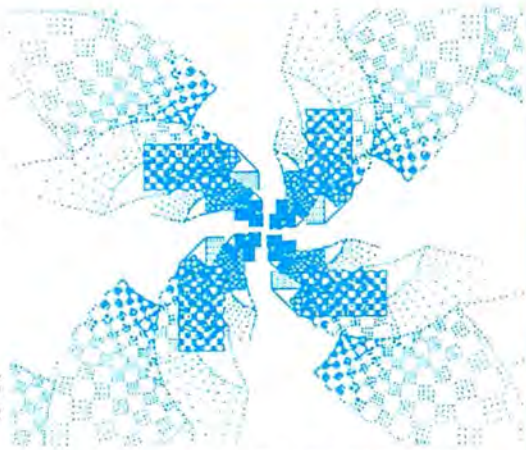
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SCRaPBOOK

EDITED BY KRISTI COALE AND JON ZILBER



DON'T AVOID THIS 'NOID

Better plan on setting aside 40 days and nights when you boot up Discovery Software's Arkanoid. Arcade-style games have finally arrived on the Mac, and this is one addictive game. On the surface, it might seem like a pretty standard brick-and-paddle-style game — in which the bricks are both obstacles and power capsules. But there are so many levels, options, and strategies — to say nothing of the stunning graphics — that you'll be hooked sooner than you can say, "Looks like rain, Noah." A nice touch is an option that automatically adjusts the speed of play to a level appropriate for people with problems of vision or coordination. You can reach Discovery Software at 163 Conduit Street, Annapolis, MD 21401; (301) 268-9877.

— *Jon Zilber*

PHOTO: TOM UPTON ICONS: JACK J. MORTENSBAK

MAC ON THE STREET

We're concerned. And so is reader Carey Chaluisant of the Bronx, NY. "I heard a rumor," Carey writes, "supported by the fact that his columns have lacked the kind of chutzpah they used to have, that John C. Dvorak was replaced by a pod from *Invasion of the Body Snatchers.* He could use the phrase 'dicking around' more often (see his column of September '86)."

Since we've recently become Mr. D.'s neighbor in these pages, we're anxious to pass along any advice we can. If *you* have favorite words, phrases, concepts, rebuses, or hieroglyphs that you'd like to see pop up more often in his columns, let us know; we'll pass the information along.

We also got a letter from *Captain* Chris Habig of Lubbock, TX, whom we misidentified as PSC Chris Habig in our July '88 Dialog Box of the Month. "I really am an officer," he notes. "A Captain. There is no such rank in the Air Force as a PSC — that's part of my address. It's short for Postal Service Center. Does this qualify me for a Bug of the Month?" No, but it qualifies you for a cameo in Mac on the Street.

Activision, an old-timer in computer gaming, has decided to revamp its corporate image, starting with a new name: Mediagenics. We think that's just about the savviest new corporate moniker since Unisys. Just what does Mediagenics mean, anyway? It sounds like a form of cancer you get by sitting too close to the TV. Anyway, our question of the month is "Who's the next candidate for a name change?" (Corporate slogan and logo optional.) Send your suggestions, predictions, and fears to Mac on the Street, *MacUser,* 950 Tower Lane, 18th floor, Foster City, CA 94404.

— *Jon Zilber*

REAL SOON NOW

[*Guy Kawasaki, a noted Silicon Valley race car enthusiast, advertising model, and fashion plate (also known as the Victor Kiam of software), has been thinking about the future. This is what he thinks is in store. — Ed.*]

- Alan Kay will get fired for using Courier font in a memo to John Sculley.
- Claris will get a real name.
- WordPerfect will sponsor a race called Pay to Betas.
- Lotus will announce that Macintosh is a strategic part of their business.
- Ashton-Tate will force Apple to unbundle the System and Finder.
- Borland will introduce a graphics product called Kahn Artist.
- Ed Esber and Guy Kawasaki will start an ice cream chain called Ed and Guy's.
- Maddie Hayes will boot her Macintosh.
- Microsoft will ship a bug-fix version of Word called "3.0something."

— *Guy Kawasaki*



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SCRaPBOOK

WE FEEL THE EARTH MOVE

You've no doubt heard in the latest news about earthquakes in California. And the outlook for the future is bad. Heck, Nostradamus predicted that the state will become an island because of a big shaker within the next five years.

Those of you east of the border may be asking yourselves "So what? Who needs blue tortilla chips, Kentucky Fried Tofu, or lifestyles based on the concept of improving one's quality of life by walking on hot coals *anyway*?" Well, Silicon Valley — and Cupertino in particular — sits right in the heart of Quake Country. And as a Mac user, you should be concerned about the safety of computer world.

Seeing that we here at *MacUser* make our living off Silicon Valley, we feel that we have an obligation (albeit a small one) to provide for the safety of the Mac hacks in the event of heavy seismic activity. To fulfill this responsibility, we are offering a few tips on what to do in such an emergency.

1. At the first jolt, hit Command-S to save your document. You are expendable; your data isn't.

2. Throw your original master key disks under a desk or other sturdy object.

3. Assume the position — throw your body over your Mac to protect it from falling debris. Also, make sure your Mac is away from windows. You wouldn't want slivers of glass getting into your computer, would you?

4. Keep an emergency supply of blank floppies, SIMMs, and power cords handy; you may be unable to get to the local dealer for a while, and mail-order deliveries may also be delayed (rain and snow are one thing, but when the Big One comes, those appointed rounds are history).

— *Rusti Coalito*

NUDE ON THE MENU?

Poor Claris. As the much-vaunted Apple Company spinoff, they've got a lot to prove, including whether they can truly be called a software company when all of their software consists of barely upgraded golden oldies (like MacPaint 2.0). Well, it appears a certain clever programmer with a penchant for soft-core fantasy graphics has inserted, much to Claris' embarrassment, an extra . . . I guess you could call it a feature . . . to MacPaint 2.0.

Information from an unnamed source in their customer service department revealed that they've been receiving calls at the rate of three an hour — mostly by Moral Majority mothers, irate to discover that the G-rating on this relatively harmless program could be upgraded to an R-rating by holding down (notebooks ready?) the Shift, Tab, and Space bar keys while simultaneously clicking on About Macpaint under the Apple menu. The Memory Available notation will be replaced by what has been dubbed the "Zebra Lady."



Rumor has it that Claris has discovered how this unexpurgated "Easter Egg" was inserted and, in a desperate attempt to preserve the corporate image, has removed it from future copies of MacPaint. The entire first two or three runs of the program have already been fully distributed with this tidbit intact, and they're destined to become a minor classic in the annals of Apple . . . oops, I mean Claris . . . software.

— *John J. Halbig*



Iomega, maker of the Bernoulli Box, has come up with some numbers that they hope will encourage you to spend just a little bit more on backup hardware. The average cost of reentering a megabyte of lost data, they conclude, is a whopping $1,341, or about $27K for a 20-megabyte drive. And that's just typing — it doesn't include the cost of figuring out just what was on the hard disk that crashed and reconstructing



the information. (If you'd rather pay a hard disk consultant/guru to resurrect the data off your crashed disk, the going rate isn't much better — about $1,000 per megabyte.) On a related note, we hear through the grapevine that Iomega has a new product in the works: the Bertinelli Box. It stores up to 20 megabytes of made-for-TV movies and is guaranteed to work come Halen high water.

Here are some more figures to brighten your day. Microsoft recently announced the sale of their one-millionth mouse. If stacked on top of each other, Microsoft notes, the mouses would reach a height of 104,167 feet, three and a half times the height of Mt. Everest. Why you would want to do this, they do not mention.

We've compiled a few figures of our own. One million mice squeaking simultaneously would produce a sound shrill enough to shatter Ella Fitzgerald. In one day, these same mice could consume enough cheese to bankrupt Switzerland. And, finally, our calculations show one million properly deployed mice would stand a fighting chance against a legion of carving-knife-wielding farmer's wives.

— *Jon Zilber*

PHOTOS: PETER A. GOULD ICONS: JACK J. MORTENSBAK

SCRaPBOOK

DAs OF THE RICH AND FAMOUS

Sure, it would be easy to figure that Guy Kawasaki would have a DA like Another Dimension which, when called, would do anything he wants. Problem is, it would take three hours or so to perform his task. But with Guy, speed doesn't really count, unless you're talking about his Porsche. But DAs aren't just for the Silicon Valley bigwigs. What about celebs? I mean, what sort of DA would Ronald Reagan or Clint Eastwood have? Well, *MacUser* has been snooping around Hollywood (a.k.a. Sculleywood, if you consider all the Macs used in movie production these days), Washington, and all points in between to give you a special look at the DAs of the stars.

With her interest in astrology, Nancy Reagan reportedly has a DA called Star Gazer. It gives the First Couple their daily horoscopes, their rising signs, and the positions of the heavens for the purposes of policy-making. The President, however, does not have a DA because it's been determined that he needs a substantial memory upgrade.

'LL B BK is Arnold Schwarzenegger's favorite DA. It automatically deletes all vowels from any document so that they read the way he speaks (with that unmistakable Kennedy accent). The MacLaine DA is a pseudo-MultiFinder DA that temporarily reincarnates the application you were working on in a former project.

Network-news escape-artist Dan Rather is fond of the Six Minutes DA. This is a presentation DA that fills in for Rather on the evening news in the event of a gap of, say, six minutes or so. However, this is not to be confused with Andy Rooney's DA, Sixty Minutes. Have you ever wondered what this DA does? Neither have we. And we're really not sure what Eastwood's DA, Dirty Harry, would do, so we welcome any hints about its function. Go ahead, make our DA.

— *Kristi Coale*

HIT LIST

Remember June? We'll refresh your memory: The beaches were packed, *Roger Rabbit* was hot, and these were the top-selling Mac software packages at Egghead Discount Software.

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2. **Microsoft Excel** Microsoft
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5. **MacDraw 1.9.5** Claris
6. **PageMaker** Aldus
7. **PowerPoint** Microsoft
8. **Cricket Graph** Cricket Software
9. **MacProject II** Claris
10. **MacWrite 5.0** Claris

BRIGHT IDEAS

We wouldn't want to say that what follow are the rejects from our monthly Tip Sheet section. They are, but we wouldn't want to say it. You'll get $10 if we publish your putative tip here — and you can't win if you don't enter, so send 'em in to Bright Ideas c/o *MacUser*, 950 Tower Lane, 18th floor, Foster City, CA 94404.

BOOK MARKS THE SPOT

The May 1988 issue of *MacUser* had a small tip on bookmarks. Here's another suggestion:

There are several ads in the magazine that have fold-out pages. These are ideal as bookmarks. Simply fold one out, and then fold it in again with the loose end tucked in to the point at which you wish to resume your reading.

This is not exactly original. All the manuals that came with my recently acquired Mac II use the same idea. Why reinvent the wheel?

Solon A. Ellison
Englewood, NJ



QUIET ON THE HEADSET

Anyone reading *MacUser* knows that Macs are legitimate players in the corporate workplace. The problem is that sometimes they play too much. One's co-workers might forget all the productive things people can do with Macs when they start hearing sounds like monkey squeaks, talking mooses, puking disks, ad infinitum.

A peaceful solution to the cacophony of the office automation wars is as close at hand as the back of your Mac. Get a set of Walkman-style headphones, and stick the jack into the back of your computer (it's the one with the speaker icon). If you want to listen in, just put the headphones on. To avoid giving the boss the impression that she's hired some middle-aged head-banger, turn the speaker up to 7 (that's 11 if you're running SpinalMac) and leave the headphones nearby. You'll hear a pleasant muffled sound. Your disgruntled colleagues will hear nothing.

"Why doesn't this jerk just turn the speaker volume down to zero?" you may be asking yourself. Because I've lost enough files while using the Control Panel in the middle of another program, and this method is actually faster. Not to mention more fun. Sometimes the analog answers to life are the best.

Eric Promislow
Ottawa, Ontario

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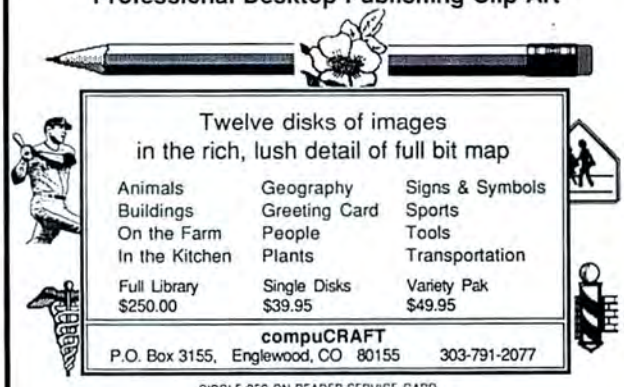
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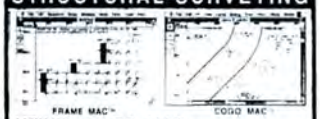
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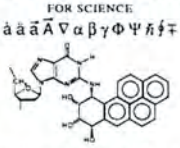
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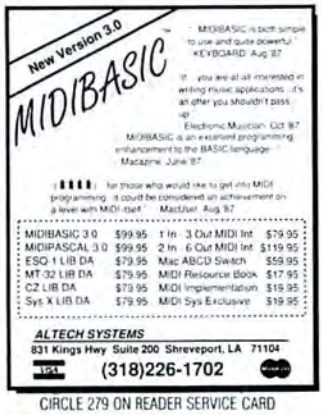
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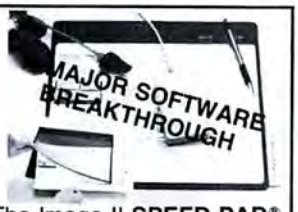


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by John C. Dvorak

HyperCard: The Forth of the 1990s

At this point it's obvious that, as a concept, HyperCard is a success. But it remains to be seen if HyperCard applications (stackware) will make anyone any money once the novelty wears off. It's possible, but unlikely. Stackware has an inherent flaw: It has the air of public domain software. The HyperCard concept, as promoted, has such a socialist air to it that the commercialization of the stacks seems somehow wrong.

Also, the cutesy nature of the HyperCard environment, with all its little pictures and clickety-click interface (where one seldom uses the keyboard), makes the software very approachable. So approachable that the sense of value fades toward nil. I've been fascinated by the concept of perceived value as an aspect of marketing and constantly try to evaluate each new product with this in mind.

So let's look at HyperCard. First of all, it's given away with each new machine, thus lessening its perceived value. To make matters worse, as a software package it is ill-defined. Is it a programming language? An operating environment? An operating system shell? A DBMS? What?

A better question is: How is it perceived by the market? I think it's perceived as a database manager — a free one. Therefore, stackware is perceived as templates or maybe templates with some data sets included (free!). Templates as a product have some track record in the world of the IBM PC. Lotus 1-2-3, a product that has evolved somewhat in how it's perceived by the users, has always had a template business chasing it. Few have had much success, and 1-2-3 templates have since become the subject of derisive comments by marketing types. It's the business that never happened.

Skeptics of this observation as it applies to HyperCard will notice that 1-2-3 differs from HyperCard in that 1-2-3 is seen nowadays as a programming language, not a database manager like HyperCard. I'll argue that 1-2-3 was seen initially as a spreadsheet and database manager and has only recently been seen as a programming language. (The Lotus 1-2-3 DBMS is still employed by countless users, I might add.) Anyway, I suspect that the perception of HyperCard — while having no spreadsheet aspect — will also evolve into that of a programming language, since the HyperTalk language is the kernel of the system and all stackware relies on programming more than it does on raw data. As more and more hopeless stackware developers design more and more stackware, the programming aspect will be further promoted.



I want to mention here that we can never ignore the "free" aspect of HyperCard versus the expense of 1-2-3. The pricing function of software has always been a reflection of total system cost. The cheaper machines have cheaper software — even if it's a package identical to that on another machine. Apple software has always been inexpensive, and the free HyperCard almost dictates free stacks. The stack downloading on CompuServe bears this out, as CompuServe is making a fortune on connect time from people downloading free stacks. So even if a 1-2-3 maven can sell a template for $29.95, it seems unlikely that many stacks will do well if they cost a penny over $9.95.

This might change radically if someone develops a stack that is truly innovative. I can't imagine what that might be. The most popular stacks consisting of endless scanned images of Playboy pinups combined with digitized moaning and groaning epitomize a HyperCard application, if you ask me. Other things we've seen are fairly useless or would function better if programmed conventionally. Two uses that I've seen may save the concept, though.

The first use is as a control language to move effortlessly through a laser disc full of images. The HyperTalk language seems well-suited for control applications such as this and might possibly supersede the cult language Forth for many control applications. I find it amusing that HyperCard and Forth have something in common: Each system created instant excitement when introduced. Forth's subsequent big fizzle as a usable general-purpose language may foreshadow the same fate for HyperCard.

The second use for HyperCard stems from its ease of use and what I like to call approachability. This makes it a perfect vehicle for children. Educational stacks seem like the biggest market of them all. Of course, while there is no money in this, there is some sense of accomplishment. Helping children learn is important, and I suppose developers can somehow wrangle some dough from the government for these efforts. This aspect of HyperCard should be no surprise to anyone, since Apple seems to have a knack for dominating the educational arena, even if by accident.

So where does all this leave the budding stackware developer who hopes to make an unholy killing with stackware? Up the creek, that's where. Greed doesn't pay anyway, so I have no sympathy for these guys. Besides that, programming a HyperCard application is a lazy man's way to write an application. The lazy, by definition, will never put in enough effort to make an appealing product.

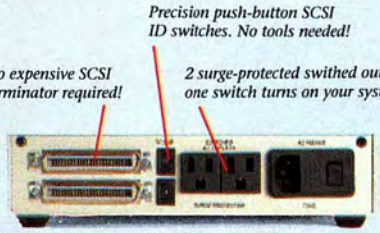
So where is the money to be made? I think we have to go back to the 1-2-3 model to discover the potential gold mine. The big money in the 1-2-3 world has been made from developers who made 1-2-3 enhancements. Products that make 1-2-3 more powerful sell like hotcakes. Turner-Hall Publishing set the pace with Note-It and SQZ! products. HyperCard could surely use more than a few enhancements. Already I've seen sorting capability designed by a vendor for use with HyperCard. Unfortunately, it's not marketed as a $49.95 add-in. That's the key, the low-price add-in. Send me a copy.

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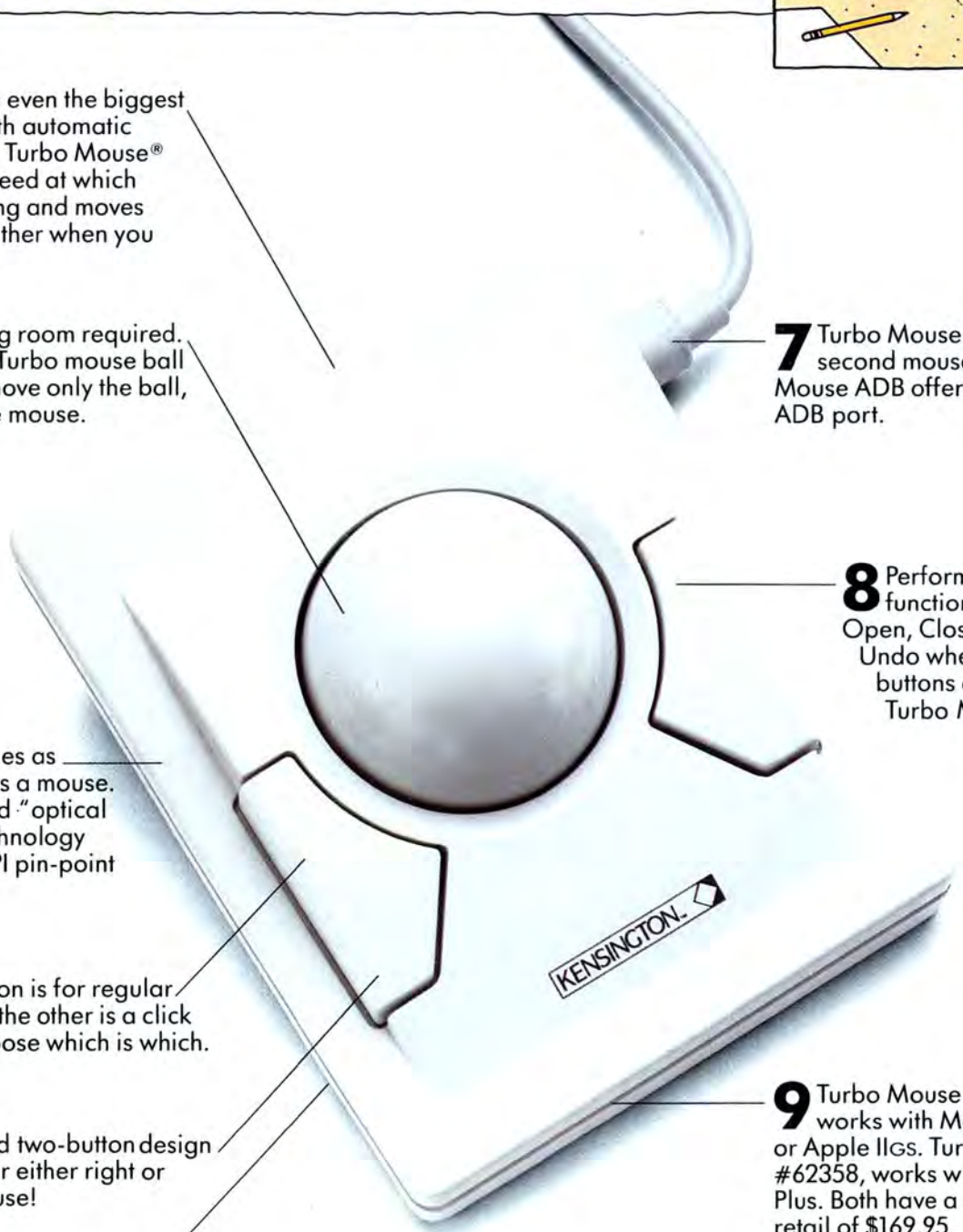
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